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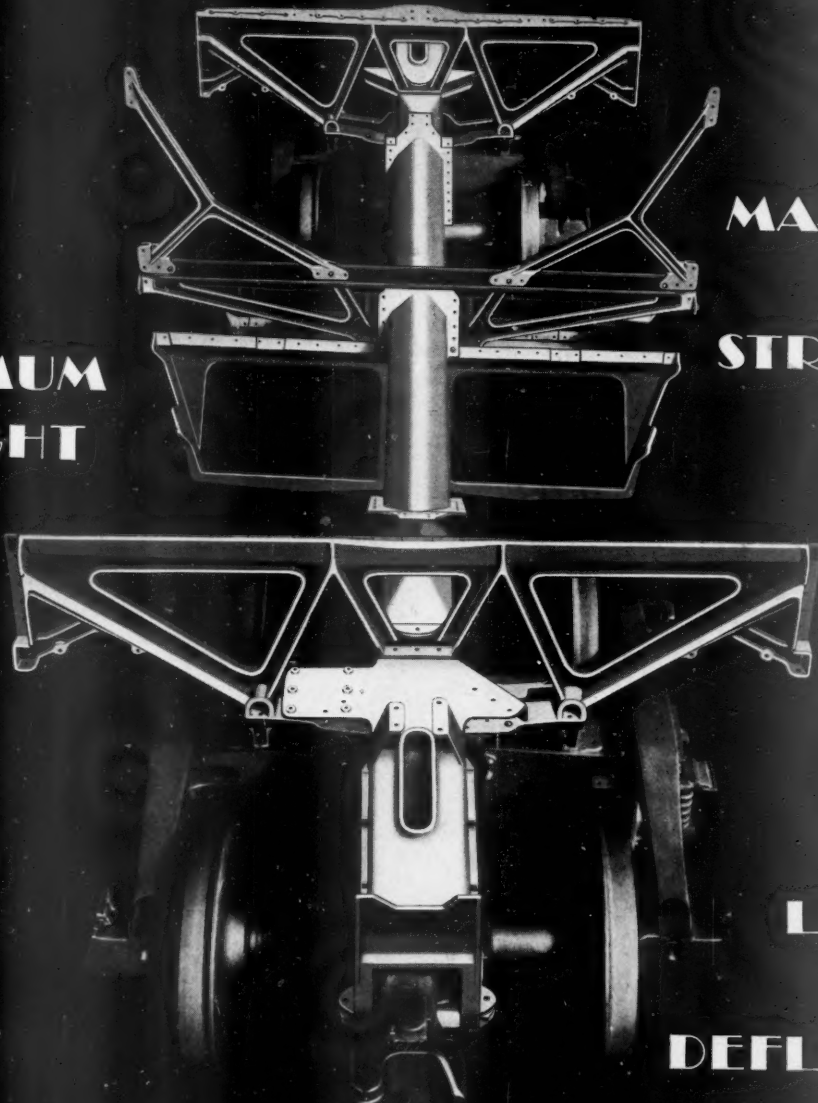
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Railway Age

DAILY EDITION

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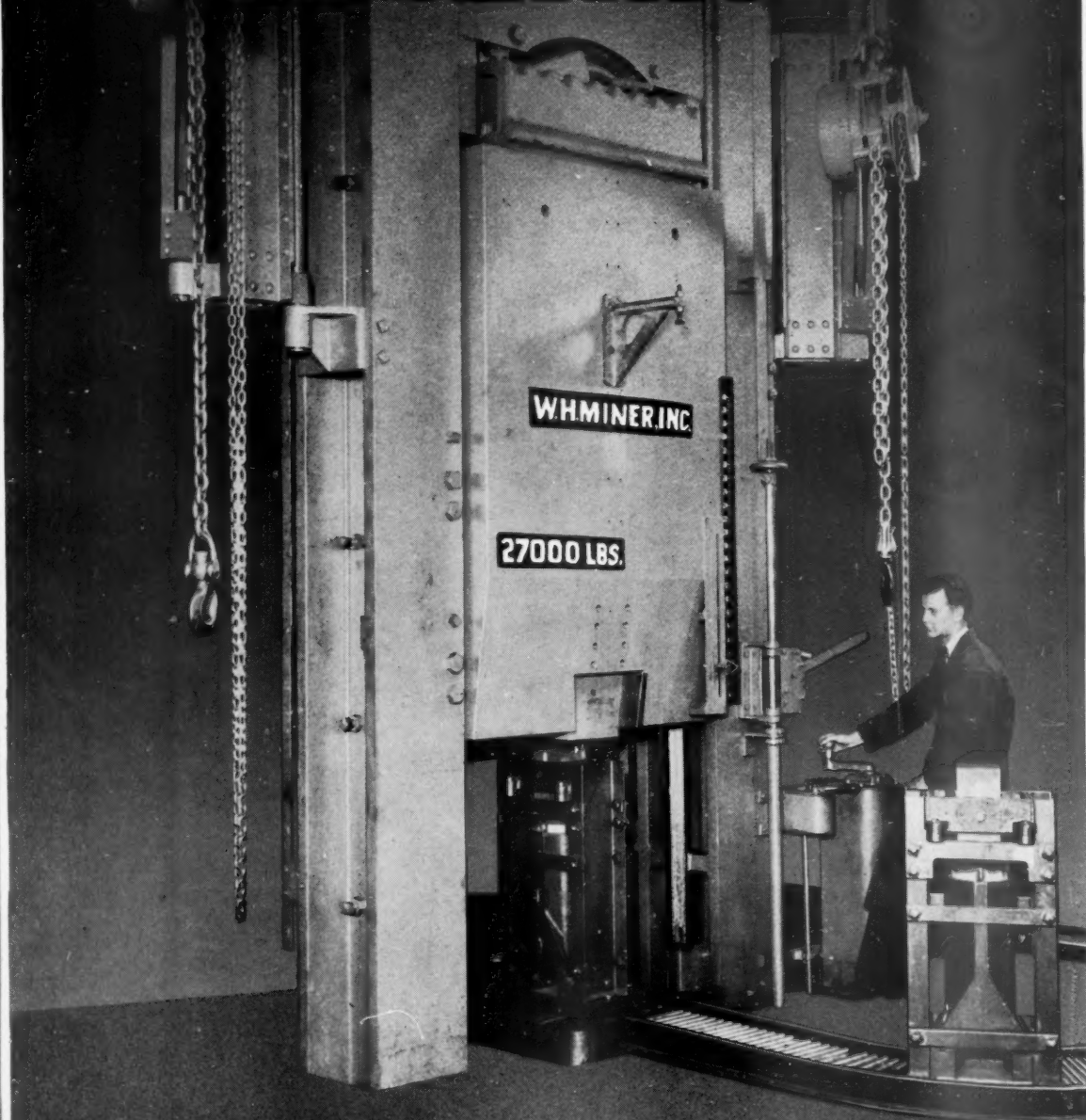
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W.H. MINER, INC. CHICAGO

Railway Age

DAILY EDITION

VOL. 102 JUNE 23, 1937 NUMBER 25C

PUBLISHED SIX TIMES IN JUNE BY THE
SIMMONS-BOARDMAN PUBLISHING CORPORATION
1309 NOBLE STREET, PHILADELPHIA, PA., WITH EXECUTIVE AND EDITORIAL
OFFICES AT 30 CHURCH STREET, NEW YORK, AND
105 WEST ADAMS STREET, CHICAGO

Other Offices at
TERMINAL TOWER, CLEVELAND
1081 NATIONAL PRESS BUILDING, WASHINGTON
1038 HENRY BUILDING, SEATTLE
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The Railway Age is a member of the Associated Business Papers (A.B.P.)
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The Gradual Process Continues

Since the discussion of the repair billing which followed the presentation of the report of the Arbitration Committee at the 1931 meeting of the Mechanical Division at Chicago there has been a persistent effort toward simplification and reduction in the number of items and the expense of billing for repairs in interchange. This has not gone as far as the advocates of certain plans for effecting such improvements hoped, but progress is being made none-the-less.

Following the informal expression of opinion asked for by the Arbitration Committee at the end of the 1931 discussion, a subcommittee began a study of the several possibilities discussed at that time. A year later a subcommittee of the Committee on Prices for Labor and Materials proposed the elimination of 242 items from Rules 101, 107, 111, 112, and Passenger Car Rules 21 and 22. Then, in the fall of 1935, the sub-

committee of the Arbitration Committee completed a report, presented before the annual meeting of the Mechanical Division in 1936, which eliminated from further consideration the proposal (1) that central or regional bureaus for the handling of all billing be established; (2) that all billing for repairs in interchange be eliminated, and (3) that all billing for repairs to foreign cars between roads only be eliminated. Aside from the probable increase in cost to the railroads which the adoption of any of these proposals would cause, the committee found so many probable dislocations of present checks to protect the car owner that the railroads would undoubtedly have faced a long period of developing new rules before interchange conditions would have been restored to a satisfactory basis.

In the report of the Arbitration Committee read at yesterday's session of the Mechanical Division is a proposal for the elimination of defect carding for slight damage to cars to further tighten the exceptions in this respect now written in Rule 4. It is in such tightening of the rules to eliminate items which are of trivial importance, from the standpoint of the costs involved and the amount of protection for the car owner, that reductions in the cost of billing repairs can most effectively be made. They arouse little opposition but, with gradual pressure for continued improvement in this respect on the part of the Arbitration Committee, marked changes may be effected in the course of time.

Thanks to You, Mr. Beale!

In an address before the Western Railway Club on April 19, on the modern railway purchasing and stores department, G. O. Beale, the new chief purchasing officer of the Chesapeake & Ohio, said in part: "While certain railways and railway officers may deserve credit for the development, that credit cannot fairly be given unless at the same time grateful recognition is made of the assistance rendered by several organizations outside the railroads. I refer to the Division of Purchases and Stores, the *Railway Age*, and Railway Purchases and Stores. These organizations have accomplished a great deal in raising the standards of the entire supply department."

What Mr. Beale said and implied about the contribution of the Purchases and Stores Division, and its predecessor organization, to the better understanding of the role played by supply departments in railway operations and to the advancement of more economical and efficient services supplied is true. It is also true that the Purchases and Stores Division is dependent for its work and results upon a corps of railway officers and employees, who, for the most part, volunteer their time to serve on committees often at some sacrifice.

They perform their assignments year after year without expectation of praise, but it is unquestioned stimulus to them to hear their work publicly acknowledged by railway officers qualified to speak on the subject.

The work of the railway press is somewhat different. Its function is to gather, collect and present to its readers, at regular and frequent intervals, not only the record of the work of railway associations, but also such other information about railroads and railway people as is interesting and useful. It neither supplants nor supplements the work of railway associations, but provides a service to its industry which is distinct in itself. While modesty forbids elaboration on this paper's efforts to serve its readers, it is noteworthy that more than 1,000 pages of special articles and news reports on railway purchasing and stores have been published by it since the purchasing and stores department of this paper was created 12 years ago.

This information was published and disseminated week by week to the far corners of the country (and the world) for the purpose of advancing railway knowledge and progress. We believe its work has been helpful. At the same time, it is pleasing to know that readers think it has been helpful and occasionally to hear them say so. Our thanks to Mr. Beale, but not without at the same time expressing our thanks to a host of railroads and railroad men whose co-operation over the years has been essential to the work.

New Structural Metals on the Tracks

One of the most striking contrasts between the 1930 exhibits and those of this year are the cars on the track exhibits. In the former exhibit of hopper and gondola cars, other than the long mill-type gondolas, none showed ratios of pay load to gross load greater than 77 per cent. This year these ratios on the open-top cars are over 80 per cent and others are only slightly under 80 per cent. The weight reductions shown in some of the box cars are no less impressive.

The real application of the new high-tensile steels to freight-car construction did not begin until 1934 and 1935. In spite of the price differential at the outset unfavorable to the introduction of the new steels, their use has been increasing during the past two years; in fact, last year several orders were placed for cars, by the thousands, to be built of the new steels, indicating a growing confidence in their qualities and thereby hastening the time when the effect of price differentials on the cost of the car will become negligible or disappear. This development in the economics of the new materials vs. carbon steel is, indeed, already well under way.

The developments in the use of stainless steel and aluminum alloys in passenger-car construction have

likewise shown great strides during approximately the same period and the effect of their advent, as well as of the high-tensile alloy steels on the technique of passenger-car construction, passenger-car weights and general appearance are strikingly illustrated in the track exhibit this year.

While perhaps of less economic importance, the advent of rubber as a cushioning and high frequency insulating material, the beginning of which was demonstrated in the exhibits seven years ago, now seems likely to play an important part in increasing riding comfort of the passenger equipment of the future. The capacity of this material to stand up under dynamic loading is probably no more strikingly demonstrated than in the rubber insert wheel developed for street-car use under the direction of the President's Conference Committee of the American Transit Association which may be seen among the exhibits this year.

Car Design And Maintenance Facilities

Each new car design introduced into service imposes upon some railroad the job of maintaining and ultimately rebuilding it. So, it is only necessary to watch the trend of new car designs to get an idea as to what may be the maintenance problem in months or years to come. The intelligent analysis of this problem will enable one to make an approximate prediction as to the character of future car-repair facilities.

As designs go the passenger car seems to be adding repair complications in the way of valuable accessory equipment while the freight car is being simplified in the interest of low maintenance and reduction in weight.

The only reason for bringing up this question of diversity in car design and the changes in the trend of design is to bring before the mechanical officers the important necessity of being alive to the possibilities of modern repair facilities as a means of assuring the lowest possible repair cost. Obsolete facilities not only serve to delay the return of out-of-service equipment to the road but they increase the cost of repair because of that very delay.

In the passenger-car field it is no longer a question of the extent to which facilities are going to be needed for air-conditioning-equipment repairs. With 10,000 cars equipped the problem is one that must be dealt with today—not in the future. Air conditioning, in turn, has made it possible to do a real job of interior decorations and have it "stay put," so, along with modern finishes for car exteriors there seems to be no question of the value of up-to-date paint-shop equipment. Yet it is amazing to find that only a few roads have installed paint-shop equipment that will permit a passenger car to be finished as it should be, with safety.

In the freight-car field welding is here to stay and

the roads seem to be alive to the fact that modern equipment pays, for even during the depression this kind of equipment was installed in anticipation of the opportunities for saving money by its use.

The use of steel wheels in freight service as well as in passenger service and the high speeds that are being made today are driving home the fact that, under present operating conditions, a wheel must be round. Old wheel lathes, obsolete in design and inaccurate in production because of age, can no longer fill the need, and with the newer machines are coming new tool steels which make it possible to keep up with the demand for wheels.

Economical maintenance is usually designed and built into a mechanical facility and while standardization, carried too far, can result in retarding progress, it might be worth while in the freight-car field to scrutinize the A.A.R. standard designs carefully from the maintenance standpoint. Approached from such an angle the adoption of the designs might be accelerated.

Lightweight Alloy Steels Are Justified

When the members of the Four-Wheel Truck Association were invited in 1930 by the Car Construction Committee of the A. R. A. to experiment with side frames and bolsters made of high-tensile steel, it was realized that the reduction in weight effected by the use of such steels could not be in inverse proportion to the increase in unit stress because (1) the minimum thickness at any point would be limited by foundry practice in pouring the castings, and (2) the proportions of journal boxes, brake-hanger brackets, columns and springs seats are not determined by stress in the side-frame truss, which stresses permit lighter sections when using high-tensile steel. From a study made by the leading truck manufacturers of the weight reductions possible in side frames of a 50-ton capacity car through the use of high-tensile steels, it has been found that the weights of the truss members can be reduced by 14.5 per cent while the reduction of the non-truss members will be reduced 11.5 per cent.

In comparing the weights of side frames and bolsters for cars of various capacities it has been found in some instances that the weights of side frames of alloy high-tensile steel and Grade-B carbon steel are 466 lb. and 529 lb., respectively, for 40-ton cars; 512 lb. and 592 lb., respectively, for 50-ton cars; and 604 lb. and 711 lb., respectively, for 70-ton cars. The weights of bolsters of alloy steel and Grade-B steel are 563 lb. and 690 lb., respectively, for 40-ton cars; 601 lb. and 802 lb., respectively, for 50-ton cars; and 774 lb. and 959 lb., respectively, for 70-ton cars. The number of side frames and bolsters used in obtaining these values was limited at the time the tests were made due to the few

which were interchangeable with side frame and bolsters of Grade-B steel. However, a comparison of the weights provides a basis for determining the justification for the reduction in truck dead weight through use of alloy steel.

Although these comments refer specifically to trucks, the greater strength of alloy steels can be used for all car construction in three ways: (1) It can be used in sections equal to that of carbon steel to increase the life of cars and reduce maintenance, (2) it can be used in reduced sections to reduce the ratio of dead weight to carrying capacity and (3) a compromise between (1) and (2) can be used to give both a substantial increase in service life and a substantial reduction in the ratio of dead weight to carrying capacity.

The objection has frequently been voiced that the reduction in weight by the use of alloy steels is offset by its added cost. However, with reductions recently made in the price of alloy steel because of its increased application light-weight alloy steel undoubtedly is pointing the way to (1) increased car capacity with no increase in tare weight and (2) reduced maintenance costs.

Modern Trucks

More or less serious difficulties with wheel shelling and thermal checking in modern high-speed passenger service are due to high static and dynamic loads, accentuated by braking from speeds substantially above former general practice. The steel-wheel manufacturers are making strenuous efforts to produce super wheels to meet this condition, and with considerable success, but until such wheels are perfected there is growing recognition of the need for easing up a little on the severity of the service requirements by providing more wheels per train and thus reducing somewhat the unit wheel loads.

In this connection L. K. Sillcox, first vice-president, New York Air Brake Company, said in his paper at the Mechanical Division meeting Tuesday morning that favorable results with lighter wheel loading have shown that there should be no hesitation in recommending the use of the six-wheel truck in some instances, even though it adds 15,000 lb. to car weight and is more costly. As a matter of fact, this penalty weight increase need not be quite so much as 7,500 lb. per truck or 15,000 lb. per car. It is true that the six-wheel truck of conventional design is approximately 7,500 lb. heavier than a modern light-weight, four-wheel truck of equivalent capacity, but, when full advantage is taken of the latest developments in manufacturing practice, improved materials and design, it may be authoritatively stated that a six-wheel truck, built along the same lines as the modern four-wheel truck, will add not more than 4,000 lb. per truck, or a total of about 8,000 lb. to car weight.

The Programs for Today

The Purchases and Stores Division, A.A.R., will hold its third and last session today, while the Mechanical Division will hold its sixth and final session.

Purchases and Stores Division

The Purchases and Stores Division will meet in Room A, at the left of the stage in the main exhibit hall of the Auditorium. The meeting will be called to order at 9:30 a.m., daylight saving time. The program follows: Presentation and Discussion of Committee Reports:

- Subject 13—Stationery and Printing.
- Subject 14—Stores Department Fire Prevention.
- Subject 15—Material Handling (Expense and Facilities).
- Subject 16—Simplification and Standardization of Stores Stocks.
- Subject 29—Exchange of Surplus Material.
- Subject 31—Material Guarantees—General Practice as to Guarantees—Failures, Methods of Handling, and Lists of Materials Covered by Specific Guarantees.
- Subject 36—Stock Book Records versus Stock Card Records.

Report of Resolutions Committee.

Report of Memorials Committee.

Report of Nominating Committee.

Election of Officers.

Mechanical Division

The Mechanical Division will meet in Room B, at the right of the stage in the main exhibit hall of the Auditorium. The meeting will be called to order at 9:30 a.m., daylight saving time. The program follows: Discussion of Reports on:

- Couplers and Draft Gears.
- Brakes and Brake Equipment.
- Wheels.

Election of Members of General Committee.

R. S. M. A. Obits

At the meeting of the Railway Supply Manufacturers' Association on Saturday, Secretary Conway presented a list of members of the Association that had passed away since the last convention in 1930. Among these were several past officers of the R.S.M.A., including:

Scott H. Blewett, president, 1902-03; died July 25, 1930.

J. Will Johnson, president, 1914-15; died October 2, 1930.

Gilbert E. Ryder, president, 1928-30; died May 17, 1932.

Edmund H. Walker, president, 1916-19; died May 31, 1932.

Mark A. Ross, president, 1906-07; died May 23, 1932.

Fred K. Shults, president, 1905-06; died November 9, 1933.

R. J. Himmelright, member Executive Committee; died March 30, 1934.

Alba B. Johnson, president, R.B.A., 1918-32; died January 8, 1935.

Members who passed away during 1936 and 1937 include:

Harry E. Daniels, West Disinfecting Company; died January 19, 1936.

Charles D. Jenks, Chicago-Cleveland Car Roofing Company; died April 14, 1936.

J. G. Platt, Hunt-Spiller Manufacturing Corporation; died July 26, 1936.

J. C. Whitridge, The Buckeye Steel Castings Company; died July 29, 1936.

Seth A. Crone, Buffalo Brake Beam Company; died October 16, 1936.

Theodore H. Goodnow, Camel Sales Company; died January 1, 1937.

W. R. Gellatly, Superior Railway Products Corporation; died April 8, 1937.

Freight Car Order

The Owens-Illinois Glass Company has ordered 50 hopper cars from the General American Transportation Corporation.

Dismantling the Exhibit

The officers of the Railway Supply Manufacturers' Association have not as yet set a definite hour for the closing of the exhibit. It is anticipated that many of the railway representatives attending the Mechanical Division and Purchases and Stores Division meetings will want to take a last look at some of the features in the exhibit after their meetings close today. Because of the length of the program, the time of adjournment of the two Divisions is somewhat uncertain. We have been asked to announce that the exact time of the closing of the exhibit will be announced over the loud speaker.

A. A. R. Exhibit to New York

The exhibit of the American Association of Railroads, which has been displayed at the convention jointly with the Railway Business Association, will be moved from Atlantic City immediately after the convention, to the Pennsylvania Station in New York. It will remain on exhibition there for three weeks.

Registration Figures

The following figures show the registration for the conventions up to three o'clock, yesterday afternoon:

	1922	1924	1926	1928	1930	1937
Mechanical, Division V.....	999	1,207	1,410	1,525	1,574	1,436
Purchases and Stores, Div. VI.	376	427	480	493	538	335
Motor Transport, Div. VIII...	.....	.....	.....	56	71	.....
Railroad guests .....	.....	.....	.....	688	819	803
Railroad ladies	1,008	1,178	1,191	1,316	1,165	1,011
Supply men	2,290	2,666	3,122	2,644	2,531	2,699
Supply ladies	573	675	725	751	598	552
Special guests	907	1,066	875	38	167	78
Complimentary .....	.....	.....	.....	239	*	.....
Total	6,153	7,219	7,803	7,750	7,463	6,914

* Complimentary registrations included in railroad guests.

Registration Association of American Railroads

Purchases and Stores Division

Adams, W. J., Req. Mark., Penna.
Baran, M. A., Storekeeper, L. I.
Bear, Orie W., Insp. Gen. Store, Reading
Bon, I. C., Supt. Recl., Wabash, Claridge
Brown, C. E., P. A., West Va. Northern
Cooley, Le Roy, Stores Insp., Reading
Coulter, E. F., Pur. Dept., C. B. & O.
Davis, Hugh J., Asst. on Eng. Corp., Penna., Ambassador
Dayton, C. H., Ch. Cl. to Gen. Storekeeper, M. C., Ambassador
Drager, Adolph, Main. of Way Storekeeper, C. of N. J.
Duffy, J. F., Stores Req., Erie, Knickerbocker
Elder, S. M., Lumber Agt., B. & O., Seaside
Ewalt, John W., Asst. on Eng. Corp., Penna., Ambassador
Fair, J. S., Jr., Off. Mgr., Penna.
Follette, A. G., Gen. Matl. Supvr., Penna., Chalfonte
Glenn, J. C., Div. Storekeeper, C. of N. J.
Gorsuch, J. W., Rep. Storekeeper, Penna.
Grammer, P. L., Asst. P. A., Penna., Ambassador
Hagerty, J. W., Gen. Supvr., Penna., Dennis
Hammond, F. S., P. A., P. S. & N., Seaside
Hanover, C. B., Asst. to P. A., C. M. St. P. & P., Ambassador
Hargrave, Wm., Sec. to P. A., Penna.
Hartlaub, Jas. L., Req. Cl., N. Y. C., Haddon Hall
Heck, W. L., Equip. Agt. Pur. Dept., Penna.
Hodges, T. A., Gen. Storekeeper, S. A. L.
Hoffman, Philip H., Jr., Req. Mark., Penna., Ambassador
Hollar, P. A., Fuel P. A., Penna., Ambassador
Jacobs, Frederick E., Cl. Pur. Dept., Penna., Ambassador
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McLair, C. S., Asst. P. A., Penna.
Martin, W. E., C. C. to Supt. of Stores, W. M.
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Schneider, Jos. J., P. A., Merchants Desp. Trans. Corp., Shelburne
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Simpson, W. I., Reqn. Marker, Penna.
Stevens, R. T., Ch. Cl. P. A., B. & O., Haddon Hall
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Thompson, C. A., Storekeeper, Penna.
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Whuler, W. A., Dist. Storekeeper, C. of N. J.
Wilson, George E., Asst. Ch. Cl., Reading
Winther, Howard, Gang Fore., Penna., Ambassador
Wright, C. G., Gen. Storekeeper, H. F., Tunis

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Amorosa, Louis, Fore., C. of N. J.
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Birley, Arthur M., Mech. Asst., N. Y. N. H. & H., Traymore
Blossom, Harry F., Spec. Eng., N. Y. C., Jefferson
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Bonstein, H. L., Ch. Draftsman, L. V., Ritz-Carlton
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Bowmaster, J. O., M. M., East Broad Top, Ambassador
Brink, T. W., Lead. Draftsman, C. & O.
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Callahan, T. P., Mgr., Tank Car Cont. Comm., Haddon Hall
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Chestnutt, J. B., Gen. Insp., Penna., Milnor
Cline, Ralph H., Div. M. M., B. & O., Seaside
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Desmond, J. J., G. F., Wash. Term., Monticello
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Ronalds, Hugh, S. M. P., L. & N. E.
Scheer, E. H., Jr., Mot. Pow. Insp., Reading
Schey, Robt., Gen. Car Insp., N. Y. C. & St. L., Claridge
Sechrist, T. O., Asst. Supt. of Mach., L. & N., Marlborough-Blenheim
Sheets, J. P. L., G. F., Penna.
Shepard, Frank H., Con. Eng., B. & O., Shelburne
Slack, Howard A., Draftsman, D. L. & W., Canfield
Spence, C. H., M. P. Insp., B. & O., Seaside
Swope, B. M., S. M. P., Penna.
Tolson, B. R., Mgr., Wash. Term.
Trinkner, R. C., G. C. F., N. Y. C.
Trogler, F. E., Asst. R. F. of E., Penna.
Veazey, F. D., Asst. M. M., N. & W., Claridge
Vogel, George C., G. F., C. of N. J.
Waters, G. A., D. C. F., Erie, Knickerbocker
Wilkins, G. B., Asst. Eng., Penna.
Winter, Paul S., M. C. B., B. & L. E., Haddon Hall

Special Guests

Altenduffer, Charles S., Car Rep., Reading
Ballantine, N. D., Asst. Mgr. Frt. Trans., N. Y. C., Dennis
Bates, L. R., Trav. Frt. Agt., B. & O.
Breed, A. C., Asst. Ch. Loco. Insp., I. C. C., Ambassador
Broughton, M. C., Div. Frt. Agt., Penna.
Brustman, Paul R., Clerk, N. Y. C., Crillon
Buzzard, Ezra Y., Trav. Acct., Penna., Knickerbocker
Carpenter, L. E., Eng. Ch. Eng. Off., Penna.
Church, R. M., Checker, N. Y. C.
Cooper, John V., Electrician, Penna.
Cooper, W. E., Supvr. Tank Car Dept., Bur. of Explo., Traymore
De Forrest, Edward T., Spec. Appr., Penna.
Doyle, L. I., Explo. Agt., I. C. C., Carolina Crest
Drayfuss, Henry, Designer, N. Y. C., Claridge
Firth, R. Smedley, Supt. Car Main., Mex. Pet. Corp., Haddon Hall
Fitch, Harold W., Supvr. of Pub., D. & W., Ambassador
Frank, Charles B., Car Rep., P.-R. S. L.
Genther, J. Edward, L. & N. E., Seaside
Goodman, Wm. L., Draftsman, Penna.
Gorak, Julius, M. S. Fore., Penna., De Ville
Haines, J. O., Supvr. of Shop Safety, Reading
Heiserman, C. B., Gen. Counsel (Ret.), Penna.
Herrick, A. A., Asst. Trans. Mgr., Sinclair Ref., Haddon Hall
Hoch, Chas. K., Car Rep., Reading
Hoffman, Geo. G., Head Cl. Acct. Dept., Reading
Hoyt, C. E., Exec. V. P., Am. Foundrymen's Assn., Ambassador
Jamison, P. G., Spec. Appr., Penna.
Johnsson, C. E., Draftsman, C. & O.
Kepner, Howard T., Gang Fore., Penna.
Kilmer, C. V., Trav. Car Rep. Acct., B. & O., De Ville
Kubli, Alfred, Dist. Psgr. Agt., C. of N. J., Ambassador
Long, J. H., Fore., Penna.
McNichol, George F., Boiler Fore., Reading, Y. M. C. A.
McVicar, Robert, Supt. Ret., Wis. Cent., Chalfonte
May, Fred J., Spec. Insp., Reading
May, Geo. F., Secretary, B. & O.
May, J. E., Fuel Agt., B. & O., Ambassador
Moore, W. E., Boiler Fore., B. & O.
Myers, John E., Pipe Fore., Reading, Y. M. C. A.
O'Brien, J. E., Spec. Rep., A. A. R., Claridge
Parks, John E., Pow. Dispatcher, Reading
Ramey, E. E., Fuel Eng., B. & O., Ambassador
Ross, B. J., Mech. Supt., P.-C. Tank, Haddon Hall
Schilke, H. A., Elec., Penna.
Steffa, W. C., Trans. Mgr., Sinclair Ref., Haddon Hall
Stier, Robert H., Eng. Asst., P. R. T.
Straub, E. D., Spec. Appr., Penna.
Sweeley, E. H., Gen. Fore. (Ret.), L. I.
Tobbert, W. C., Sec., Am. Ry. Car Inst., Claridge
Wolfinger, I. P., Gang Fore., Penna.

Conventionalities . . .

It is reported that two of our young supply men, Lou Metzgar and Payson Smith, are experts at opening up summer cottages, having graduated from Tybee Coast University in Georgia.

A Record

Known familiarly as "Andy," A. M. Anderson of the Gould Storage Battery Corp. enjoys the distinction of being the first electrical apprentice appointed by The Pullman Company in 1899.

Vassar Graduate

Jane Anne McKee, daughter of N. T. McKee, of the Superheater Company, is here for her second convention. She has just been graduated from Vassar College.

A Magician

Bill Horton of Murphy Varnish Company, is up to his old tricks. He hasn't lost his art of legerdemain. He has been kept busy and has been one of the guests at many parties with his card tricks. He is well named "The King of Cards."

For Suffering Husbands

Mrs. Frank Cunningham of Graham-White Sander Corporation believes she holds the world's record on economy in evening gowns worn at the grand ball last week. It was a cotton creation costing the sum of \$1.26. Cotton manufacturers please note.

Robert McVicar and Daniel Willard

Fifty-eight years ago Robert McVicar was a locomotive engineer on the Connecticut & Passumpsic River Railroad, now part of the Boston & Maine, and he had a very good fireman—a young fellow in his "teens," named Daniel Willard. He and Mr. Willard have been friends ever since, and he came here from Baltimore, where he had been visiting with his former fireman, who for the last 27 years has been president of the Baltimore & Ohio.

Mr. McVicar went from the "Passumpsic" to the Lake Shore

& Michigan Southern as a locomotive engineer, and soon caused Mr. Willard's employment on the Lake Shore in the same capacity. He was for many years connected with the Galena Oil Company, and retired from the presidency of its Canadian Company in 1926. He is 86 years old, but still active mentally and physically, and especially interested in public affairs, which he does not think are going too well.

Sam Is Some Hustler

Sam Pryor, of the Southern Wheel, is still going strong, despite the energy he has used in recent months in helping to sell bonds for the World's Fair in 1939, and in heading up the New York Railroad Club outing, which took place a week before the opening of the conventions.

Dean of Them All

F. C. Fechtig, purchasing agent, Atlantic Coast Line, has 56 years continuous service to his credit, 43 of them as a purchasing agent. He is also considerable of a reader, having a library of 1,600 books, including bound volumes of the *Railway Age* for the past 30 years.

A Critical Eye

Tom O'Leary of the Johns-Manville Sales Corporation is inspecting the exhibit with a critical eye and has expressed his approval of the splendid display. Tom was president of the National Railway Appliance Association in 1936 and at present is a director of that association.

Short Service Record

G. A. Goerner was probably a purchasing agent for a shorter period than anyone else ever served in that capacity. He was transferred from the Burlington to its subsidiary, the Colorado & Southern, as purchasing agent of the latter line. He held the position for less than one month before he was transferred back to the Burlington and promoted to general storekeeper.

Doing Things

Herbert W. Wolff, senior vice-president of the American Car & Foundry Company, is getting to be quite a society man. He made a splendid record as general chairman of the big dinner of the New York Railroad Club last December, and he also functioned as chairman of the Reception Committee for the Railway Business Association dinner.

Fast Traveling

The record for the quickest automobile cross-country jump goes to Fred Wilhelmy, of Cleveland Tanning Company, unless, of course, some other aspirant comes forward to claim the title. Mr. Wilhelmy jumped in his car at Cleveland on Sunday evening at six o'clock, and arrived at Atlantic City at nine o'clock the following morning. The success of this dusk to dawn hop has convinced Fred that he "can take it."

Makes Him Step Lively

It seems that members of the R.S.M.A. Executive Committee must have some golf records to qualify—at least in their family. E. J. Fuller, vice-president of the Hunt-Spiller Manufacturing Corporation, qualifies through his wife, she having made a hole-in-one recently at the Charles River (Mass.) Country Club. Bert says she gives him 12 strokes and he has to work hard to make good.

Asbestos Vest Wanted

Any exhibitor in a position to furnish an asbestos vest can probably make an immediate sale to D. M. Mills, mechanical engineer of the Chicago & North Western. Several weeks ago Mr. Mills and his family attended the graduation of his daughter. Just as he was about to enter the church, a spark from his cigar caused his fountain pen to catch fire. He quickly tore the burn-



ing pen and the pocket from the vest with the result that no serious damage was done except that those near him during the graduation exercises were aware of a strong odor of burnt clothing.

Keeps Busy

Charlie Chambers, retired superintendent motive power of the Central Railroad of New Jersey, is having a busy time attending the meetings and studying the exhibits. He was president of the Master Car Builders' Association during the World War years, 1917 and 1918, and was chairman of the Mechanical Division when it was formed and when it held its first meeting in Atlantic City in 1919. Mr. Chambers is accompanied by Mrs. Chambers. He is quite active as a banker in Roselle, N. J.

90 Years Old and Still Going Strong

Mrs. Martha E. Hicks, widow of Capt. Alfred E. Hicks of Civil War fame, and 90 years old, visited the exhibit Tuesday afternoon and took a keen interest in looking it over from her wheel chair. She is the mother of L. W. Hicks, president of the Penn Iron & Steel Company, and vice-president of the Allegheny Steel Company. She has nine great grand-children, the eldest of whom will attend Yale University next year.

Meet the Navy

L. F. Wilson, president of the Wilson Engineering Corporation, spent a lot of time among railroad "hoghands" and other brands of land lubbers, but with a commission of Lieutenant Commander in the United States Naval Reserve he manifestly has a weakness for water that exists beyond locomotive feed-water. He was executive officer of the first cruise made by naval vessels on the Great Lakes to Gulf waterways. No wonder he did an admirable job on the program of the Western Railway Club.

Switching Hats

Everything doesn't happen at Atlantic City. For instance, J. Henry Schroeder, vice-president of the Sunbeam Electric Company, had his own straw hat when he boarded the train at Evansville, Ind. When he got off the train at Atlantic City

he discovered he was wearing some other person's hat. Henry says there is no harm done for he understands that switching is a normal railway operation, and anyhow he dislikes wearing straw hats whether his own or someone else's.

Railroad Enthusiasts

A meeting of the Railroad Enthusiasts is announced for July 2 at the Reading terminal in Philadelphia. T. H. Bateman, of W. H. S. Bateman & Company, will show motion pictures of the Reading Ramblers' trip, as well as pictures of the Atlantic City conventions.

Going Places

Phyllis Bard Browne, the younger daughter of that Chesterfieldian Superheater Beau Brummel, graduated from Hastings-on-the-Hudson High School Monday evening, and Mrs. Browne had to leave the convention to represent the family. Phyllis is preparing to go to the Mary Baldwin College for Women at Stanton, Va. Her sister, Virginia, is now in art school and is planning to extend her studies in Italy next year.

Fresh Water or Salt

When it comes to fresh water fishing in Canada, all of Bob Sherlock's friends are willing to concede that if there are fish in the water he will get them. (Bob isn't the director of one of Canada's fine fishing clubs by accident.) However, they started to laugh when he sat down to salt-water fish off Atlantic City on Tuesday. But not for long, for Bob started to pull them in and kept it up until he had caught 295 porgies—all in two hours. Fresh water or salt, it's all the same to Huron Washout Plug Company's general manager.

Early Steel Car Designer

One of the track exhibits which is attracting much attention is the Bessemer hopper car which was built of structural steel in 1896. It is not generally known that Guy M. Gray, superintendent motive power of the Bessemer & Lake Erie, was a draftsman in the office of the Pittsburgh, Bessemer & Lake Erie, the predecessor of the B. & L. E., and worked on the design of this car. It was built by the Keystone Bridge Company, a subsidiary of the Carnegie Steel Company.



A Bit of the Skyline Along the Boardwalk



In the New York Central's New Stationery Store at Cleveland, Ohio

Purchasers and Storekeepers Have Another Big Day

Three new subjects and a debate feature
second day of annual meeting

REINFORCED with new arrivals, including several purchasing and stores officers who had no expectation of reaching Atlantic City a few weeks ago, the Purchases and Stores Division, A. A. R., went into the second round of its convention on the shores of the Atlantic yesterday, with interest unabated despite the hard seats and cramped space of the arena set apart for its deliberations. The highlight of the day's festivities and an innovation in the proceedings which gave new vitality to the sessions was a debate between the proponents and opponents of the proposition that all

price clerks be fired and the business of pricing requisitions turned over to stockmen.

The convention also considered three new subjects in the report on purchasing automotive material for highways, on maintenance of way material, and proposed standard governing the size of packages in which to purchase various materials. Inventory comparisons, stores expense, fuel buying, forecasting requirements, and development in purchasing office methods were also considered during the day. The proceedings were in part as follows:

Report On Railroad Fuel

Joint committee with Mechanical Division rejects
plan of rating locomotive coal

A committee, composed of representatives of the Mechanical and Purchases and Stores divisions, submitted the report.

Consideration was given to the adopted Standard Inspection of Railroad Coal and the proposed Method of Rating Locomotive Coal, distributed by the Association in September, 1934, it having been reported by the purchases and stores committee that the railroads had not adopted the recommended method. After discussion, it was unanimously agreed that a statement should be issued to the general committees of the mechanical and purchases and stores divisions, as follows:

After further consideration of the method of rating locomotive fuel, the joint committee is of the opinion that the most important factors covering physical characteristics are not definitely valued and, without being so valued, the method has not been practical and has not been generally used in the purchase of coal. The procedure would involve a number of expensive tests which have not been found expedient by the individual member lines. The joint committee also considered "Standard Inspection of Railroad Coal," and it was unanimously agreed that no further change or additions were advisable at this time.

It was also decided to recommend that a joint committee of purchasing and mechanical representatives be appointed to handle fuel problems of mutual interest, which present themselves.

Action by the general committee of the Division was that further consideration of the method of rating should be given either by the individual carriers, or by the A.A.R. before this rating could be effective, and should give numerous tests which would be required and outline the expense of such tests, etc. The General Committee also recommended that further consideration of the subject of Rating Locomotive Coal be discontinued.

Statistical Data

The Interstate Commerce Commission Statement M-230 was changed January 1, 1936, but for comparison certain pertinent data from this and earlier statement is submitted in the accompanying table.

The committee consisted of: P. A. Hollar (chairman), fuel purchasing agent, Pennsylvania; Robert Collett, fuel agent, St. Louis-San Francisco; W. J. Hiner, general fuel agent, New

York Central; A. E. Johnson, fuel agent, Chicago, Milwaukee, St. Paul & Pacific; G. W. Leigh, purchasing agent, Minneapolis, St. Paul & Sault Ste. Marie; M. H. McGlynn, fuel agent, Chi-

Year	FUEL FOR LOCOMOTIVES		Southern Dist.	Western Dist.
	United States	Eastern Dist.		
1932*	\$1.66	\$1.46	\$1.42	\$2.17
1933*	1.58	1.38	1.39	2.06
1934*	1.83	1.75	1.65	2.10
1935*	1.89	1.82	1.76	2.11
1936†	1.89	1.83	1.75	2.07

* Average cost of coal per ton, excluding direct freight charges.

† Average invoice price of coal per net ton, F.O.B. mines.

NET TONS PURCHASED			
1936	88,676,516	44,528,578	20,227,855
			23,920,083

cago, Rock Island & Pacific; J. E. May, fuel agent, Baltimore & Ohio; F. D. Rosebrook, fuel agent, Chicago & North Western; G. E. Scott (chairman ex-officio), purchasing agent, Missouri-Kansas-Texas.

The report was accepted without discussion.

Report on Inventories and Stores Expense

Uniform accounting methods urged—Investigation of comparative storekeeping costs proposed



M. E. Baile
Chairman

At the 1926 annual meeting, the Division accepted a report, recommending a means of comparison of material stocks and operating costs known as the Material Stock Report. Since that time, each succeeding committee has revised and amplified the forms until we now have the stock broken down into 12 headings which reflect the number of days' stock on hand. The report shows individual railroads, with their mileage, so that, to an extent, comparisons can be made between railroads of similar operating and accounting conditions and

practices. While similar progress has been made in the uniformity of stores' operating costs, as brought out in the 1935 report of this committee, there still exists varying interpretations as to expenses properly included in stores expense, which prohibits accurate comparisons. Standard material accounting practices would insure uniformity.

The importance of this subject is apparent, and this committee feels that only through continued research and the conscientious co-operation of member lines will we be able to provide a measure for material stocks and handling costs that will meet our needs.

Material Stock Report

The study suggested by the 1936 committee was made, by selecting railroads rendering complete and those submitting incomplete data. Four railroads were visited. Those railroads maintaining a classified balance were agreeable to submit complete figures, but, because of varying accounting practices and operating conditions, the report is not considered conclusive for comparative purposes. The committee feels that to make a complete analytical study would consume a great deal of time, necessitating a special force and appropriation. This expense is not justified until such time that standard material accounting is accomplished.

The following changes are suggested in order that the complete stock report will carry the audited figures in Account 716:

"The 'On Hand End of Semi-Annual Period' figures should be the value of all Unapplied Materials on Hand, as shown in Account 716—General Balance Sheet."

Eliminate Note "C", which concerns consignment stock, from the report entirely.

Stores Expense

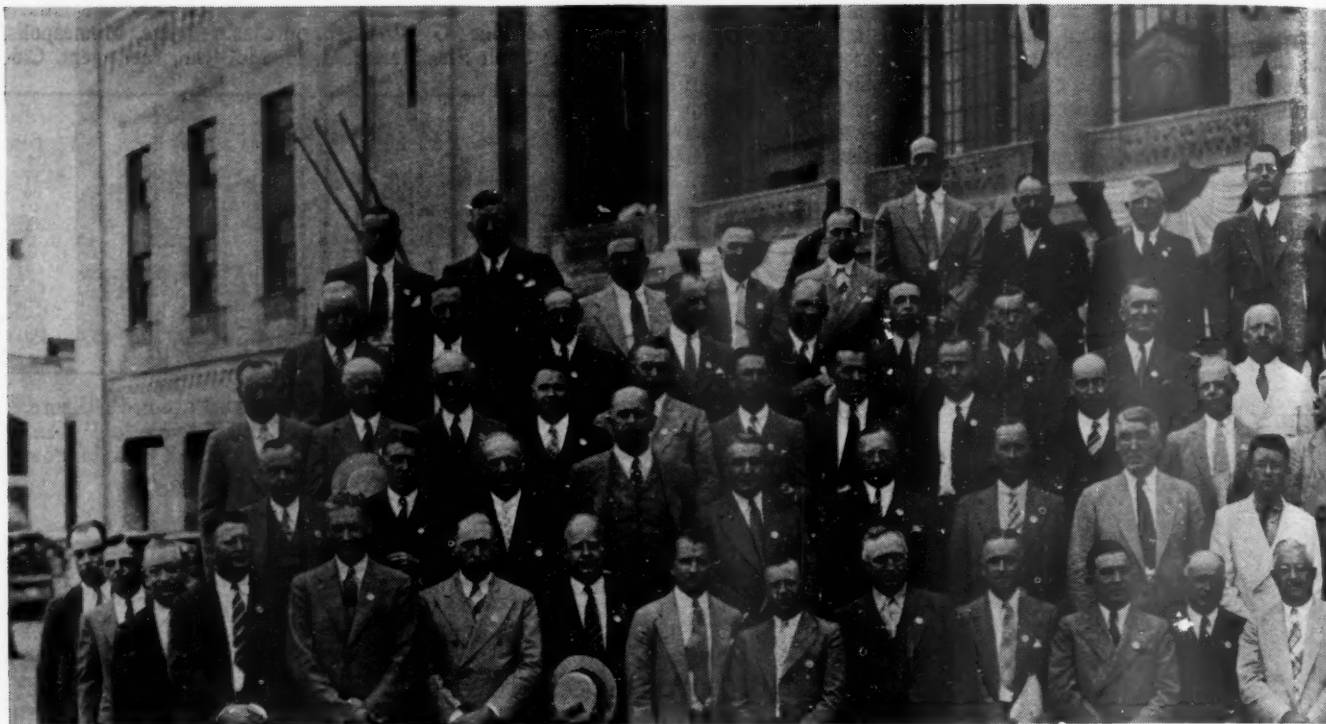
In order that authentic data relative to total costs of stores department operation may be available for the information of the Division, it is suggested that the store costs for each railroad be reported to the secretary for the calendar year of 1937, under the following headings, it being understood these figures will not be used for comparative purposes or for publication:

1	2	3	4	5	6	7
Total Store Payroll	Charge to Store Expense	Labor of Other Departments	All Other Charges	Total Charge to Store	Physical Handling Labor	Delivery of Material to Shops
Col. 1—Total store department payroll (including reclaim, scrap handling or other special operations under stores department supervision)						
Col. 2—Store payroll charged to store expense						
Col. 3—Labor from other departments, including proportion of purchasing expense charged to store expense						
Col. 4—All other charges to store expense, including supplies, fuel, power, switching, etc.						
Col. 5—Total charges to store expense						
Col. 6—Cost of labor only in physical handling of all materials except locomotive fuel, rail, ties, ballast, scrap, commissary and stationery.						
Col. 7—Cost of shop delivery regardless of payroll on which carried. If charged to store expense, so designate.						

Inventory

The cost of compiling annual inventories is an important factor in stores operating costs. Investigation brings to light many different methods of compiling inventories, with varying costs. Each apparently meets the requirements of the Interstate Commerce Commission. Considerable savings can be made by the adoption of a standard simplified inventory method that will meet all requirements, and we suggest that a joint committee be formed of members of the Purchases and Stores Division and the Accounting Division, to formulate standard inventory methods.

The committee consisted of: M. E. Baile (chairman), assistant supply agent, Missouri Pacific; O. L. Browne, assistant to purchasing agent, Atlantic Coast Line; S. A. Hayden, general storekeeper, Missouri-Kansas-Texas; E. H. Landers, general storekeeper, New York Central; J. F. Riddle, statistician, stores department, Pennsylvania; W. L. Wheeler, assistant general



storekeeper, Chicago & North Western; O. A. Donagan (chairman ex-officio), general storekeeper, Boston & Maine.

Discussion

In the absence of Chairman Beale, who has been confined to a hospital, the report was presented by O. A. Donagan (B. & M.).

A. S. McKelligon (S. P.): This material stock report is not working out as advantageously as you state. You don't get the figures. Also, there are two or three large properties that report miscellaneous material in amounts all out of reason. It should be divided up. That is not any criticism of the railroads,

for example, the New York Central, the Pennsylvania and the Santa Fe. There are 7 or 8 million dollars in that, while a number of other Class I railroads have about 500 thousand dollars. You have too many classes. If you cut that down to six classes, you would get a real report from every railroad. Those classes might be: new rail, relaying rail, crossties, fuel, scrap, commissary supplies, stationery, and all other materials. All railroads could report that clearly and get a better report, rather than sticking to these classes. In connection with stores expense, you show delivery of material to shops. That is strictly a shop expense item, and why put that in there unless you include many others such as supply trains or supply cars?

Mr. Donagan: The committee gave a lot of consideration to

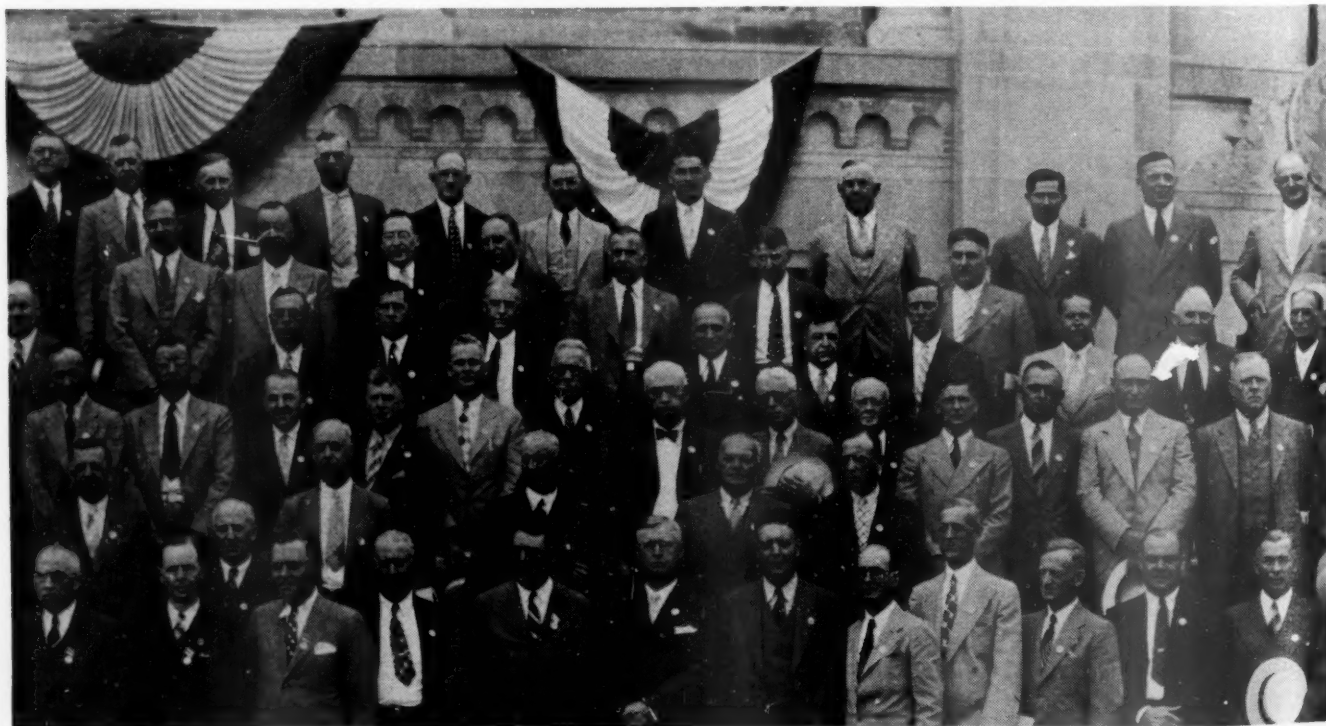


Photo by Hess

Railway Purchases and Stores Officers Attending the Annual Meeting on June 21



changes, and it was the consensus of opinion that the present report could be furnished by all roads who were working to the A.A.R. classification. Further, roads not using the classification would be in position to furnish the data as called for on the report.

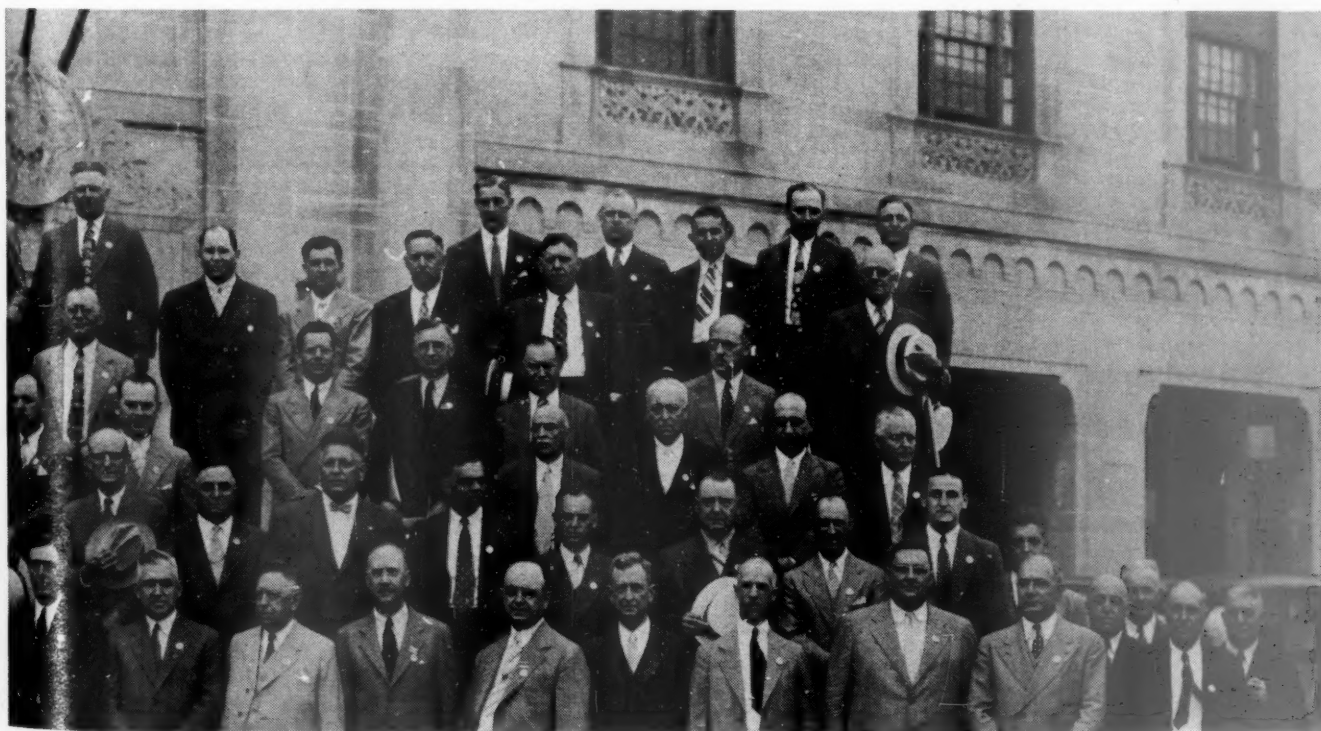
Mr. McKelligon: Why don't you simplify it by taking about six classes and then say, "all other material?" The majority of the reports we make up are at variance with this. You get a better figure than you do here. It is too complicated. You admit they won't give you the figures. Why not then make it so simple that they will give you all the figures? You have maintenance of equipment material, maintenance of way material, and material common to all departments. Now material com-

mon to all departments is in both of those classes. Maintenance of equipment and maintenance of way could just as well be one.

Mr. Donagan: More and more roads are adopting the A.A.R. classification and we have been hoping that we would finally get 100 per cent adherence to it. On our own road, it takes about one hour per month to compile the information, and by the end of the year we figure about one day's work to compile the entire data for this report.

Mr. McKelligon: You say adherence. The railroads who claim that they have this classification don't furnish the figures. How do you answer that?

Mr. Donagan: Some roads don't care to give the entire detail, perhaps, and in those cases we have to pass it up.



Approximately 350 Members and Guests Were Present at the Opening Session

But I think you will find the majority of the roads are furnishing it, and to such roads, it is mighty handy for comparative purposes.

G. E. Scott (M. K. T.): If we do what Mr. McKelligon suggests, we would almost be following out the classification in Account 716 in the general balance sheet, and the purpose of this report was to segregate that sufficiently so that all roads could indicate about what they were doing in the separate classes.

C. H. Murrin (L. & N.): Does the committee have in mind that the secretary will get out an inquiry for stores expense data?

Mr. Donagan: That would probably be the way it would be issued. The information was not to be broadcast but simply held for the benefit of committees in their studies.

G. A. Goerner (C. B. & Q.): How many roads' charges for switching cars are charged to store expense?

Mr. Donagan: Switching is generally included in store expense where it amounts to any considerable figure. At the joint meeting with the Railway Accounting Officers Association two or three years ago, it was recommended that a certain amount of switching should be included in store expense. Incidental switching according to the ICC rules, is not properly chargeable to store expense.

J. C. Kirk (C. R. I. & P.): The ICC instructions are that any switching in excess of two hours a day should be charged to store expense. If it is less than that I think that the operating departments absorb it.

L. C. Thomson (C. N.): Has the committee given any thought to the fact that on a great many roads the accounting by the stores is charged to stores expense, whereas on some of the other roads where accounting is done by the accounting department it all goes into the accounting expense.

Mr. Donagan: We gave that consideration, because I happen to be one of the group where the accounting is performed by the accounting department.

Under Labor from Other Departments, including proportion of purchasing expense charged to store expense, that expense would be included. It would be well, though, to add a footnote that it includes accounting expense for work performed by the accounting department.

Mr. Thomson: I'm on the other side of the fence. We do our primary accounting and it is charged into store expense. I hardly think that labor from other departments covers it because we have a great many places where the mechanical department has a man and charge us with that time. I would like to see the accounting set out as a separate item.

Mr. Goerner: Something was recently issued by the I.C.C.

which seemed to cancel the former statement, that no switching would be charged to stores expense. I haven't been able to succeed in getting our accounting department to go along with it.

Mr. Kirk: That came up in one of our group meetings, and I thought I had found something that I could get out of stores expenses, but our accounting department ruled that we would have to continue to absorb that expense in store expense. Mr. Thomson's point was good. It is true that where the accounting department does the accounting it isn't charged to stores expense, but on some roads the stores department does the accounting and it is charged to store expense. That puts those roads in a rather unfavorable light in making any comparisons.

Mr. Donagan: There was a recent ruling in connection with store expense which answers the question, "What expenses should be included in clearing account Material Store Expenses, for (A) maintaining material records; and (B) handling material?"

The answer to (A) was: "It should include the cost of labor expended and material consumed by purchasing and stores department in ordering material; in making records of material received; including the checking and vouchering of invoices; in making record of material issued from stock; including pricing of requisitions and making invoices; and in making records and reports of material in stock."

Under (B) it says, "Handling of material should include the cost of handling new material: (a) From the point received by the stores department if delivered directly to it by the shipper, or from the point delivered by the transportation department, at the freight station or on cars. (b) To the storehouse counter or delivery platform for material delivered locally for use in shops or for other purposes, or to the point of delivery to the transportation department at station, or loaded on cars for material shipped out on the line."

C. K. Reasor (Erie): Did the committee find any railroads that put in their disbursement column material brought from stock and later included in the disbursement column again when charged out in the finished state; in other words, getting two disbursements?

Mr. Donagan: I have no knowledge of any road so handling it. One question Mr. McKelligen asked relative to the delivery of material to shops has not been answered. On many roads the shop delivery forces are on the store department payroll and would accordingly appear in their total payroll, and the proposal would give an opportunity for taking it out. We purposely left off this report any reference to the issuance of material. It was not with any idea of trying to check up anybody's ratio of store expense, but to give us certain figures as to what the total charges to store expense are.

The report was accepted without further discussion.

Report on Highway Trucks and Buses

Survey of method of purchasing and supplying motor equipment
results in sixteen recommendations



C. E. Smith
Chairman

A questionnaire was sent to several rail-roads having extensive motor vehicle operations and from the replies received, which are appended, the following practices are recommended:

Buses and trucks should be purchased to manufacturers' specifications, except extras required by state regulations. Separate prices should be obtained on the truck chassis and body, also on the job complete, and the business should be placed to the best advantage. All repair parts should be purchased locally if accessible and the prices are found to be reasonable. New equipment and repair parts should be purchased on

the basis of defective material being replaced or adjustments

made. Purchasing bus and truck tires on a mileage basis or outright purchase should be optional. Experiments should be made with retreaded tires where outright purchases are made. Installation of storage tanks should be made where practicable so that gasoline can be purchased in tank cars or tank wagons.

Experiments should be made with repaired roller bearings. All lubricating oil drained from crank cases should be reclaimed. All used parts removed from vehicles under repair or released from vehicles dismantled should be reclaimed if it is economical to do so. Overhauling programs should be based on a definite schedule so that the purchasing department can order materials at least 30 days in advance of actual requirements. Selling, trading-in or dismantling should be optional, depending upon conditions. Delivery of buses and trucks purchased, by rail or under their own power, should be optional. Records showing the cost of all parts issued to each bus or truck should be maintained. The material classification recommended at annual meetings in 1931 and 1932 should be used only at stores where stock

of \$10,000 or more are carried. Classifications to be used at other stores should be Class 1—Repair parts; Class 2—Gasoline; and Class 3—Oil and grease.

Question No. 1—To what extent are buses and trucks purchased to manufacturers' specifications?

Road A—Broadly speaking, mainly on specifications meeting state regulations. Usually specify a definite type of seat in buses. Road B—Manufacturers' specifications followed in most cases. Road C—No buses purchased. Trucks purchased to manufacturer's specifications, except extras required by state regulations. Do not specify makes of headlights, batteries or other equipment. Road D—Coaches are purchased as a rule to coach manufacturers' specifications, except such extras as are required by state regulations. When we are charged an exorbitant extra, we eliminate them. Road E—Buses are purchased entirely to manufacturers' specifications, except such extras as are required by state regulations. In the case of trucks, a few individual requirements are definitely specified, such as payload, tire sizes, battery rating, body dimensions, material, thickness of floor, etc. Road F—Accept motor coach manufacturer's specifications. Road G—Accept motor coach manufacturer's specification, except certain accessories, none of which increase the cost appreciably.

Question No. 2—In purchasing new highway trucks: Do you obtain prices on job complete, or do you get a separate price on chassis and bodies from manufacturers?

Road A—No body prices from chassis manufacturers. Road B—Job purchased complete. Road C—Complete breakdown of prices, including taxes, accessories, etc. Road D—A breakdown showing cost of chassis and body. Road E—Bidders are required to show truck chassis and body prices separately, which gives a check on the character of body being offered. Road F—Get prices on complete job. Do not purchase trucks.

Question 2A—Do you also get separate prices on bodies to specifications from body manufacturers, in order to determine whether or not it would be advantageous to purchase chassis from chassis manufacturer and bodies from body manufacturer?

Road B—On pick-up trucks only. Road C—In cases where the body price is high, we obtain prices direct from body manufacturers and place the business to the best advantage. In these instances, we prepare our own drawing of the body desired. Road D—If the cost of the body seems excessive, we prepare a body specification, then make a comparison between truck manufacturer's price and body manufacturer's price. Road E—Where special bodies and special equipment are required, such as line construction trucks, winches, derricks, etc., the bodies and equipment are purchased separately. Bus bodies are purchased separately from body manufacturers. Road F—No. Road G—Once secured prices on bodies and chassis separately but not in recent years.

Question No. 3—How are prices for repair parts controlled?

Road B—Bids, where possible. Road C—We pay established prices, less 25 per cent discount which is allowed to fleet users. Road D—Prices for repair parts are controlled by getting competition whenever possible, also making contracts for various periods. Road E—Prices for repair parts are controlled by the fleet owners' discount. Blanket orders are issued on the firms allowing best discount. Road F—By comparison with manufacturer's published list price. Road G—To a great extent we are dependent upon manufacturer's list prices with varying discounts on repair parts, except on items which we purchase under contract arrangements.

Question No. 3A—What items are stocked and to what extent do you depend on local sources of supply?

Road A—Practically all chassis and engine parts as well as commonly used body parts are stocked. Quantities are limited to a 60 days' supply, controlled by perpetual inventory and price record. Emergency and rarely used parts come from local sources. Road B—Where prices are the same, purchases are made locally. Road C—No items stocked. Depend entirely on local sources of supply, unless a special part involved, when the purchase is made from the factory. Road D—We have a complete card record of prices, also hundreds of price lists from automotive manufacturers quoting certain discounts from lists. We stock such items as lamps, bolts, nuts, lockwashers, ball-bearings, skid chains, brake blocks. We depend upon local sources of supply in all cases where we can purchase just as reasonable as elsewhere. By doing this, we do not have to carry the stock. Road E—Items are not stocked, except small emergency supplies. Local sources of supply are depended upon, and usually several firms in each consuming district are assigned blanket orders. Road F—All fast moving parts are stocked. Depend on local sources for approximately 50 per cent of all items purchased. Road G—We have a stock of between \$20,000 and \$25,000 at various points on the system, principally at one shop. Wherever manufacturers have branches, we depend upon them to maintain stock; we also buy from jobbers locally where they are state representatives and can get the discount.

Question No. 3B—What parts are purchased from original manufacturers of buses and trucks?

Road A—Very nearly all of the parts not commonly manufactured by the makers of the vehicle can be bought more cheaply from the accessory manufacturer or his jobber. Road B—All except electrical, ignition, tires and bearings. Road C—Only items that we have difficulty in obtaining locally. Road D—The only parts we purchase from original manufacturers of buses and trucks are such parts that we have been unable to get elsewhere for less. Road E—Original manufacturer is depended upon for special parts only. Road F—Engine parts, front and rear axle parts, transmission, drive line and body parts. Road G—All parts from the original manufacturer with the exception of batteries, spark plugs, springs and brake drums.

Question No. 3C—What parts are purchased from accessory manufacturer?

Road B—Magnetos, generators, etc., also tires and batteries. Road C—Practically none. Majority of parts are furnished by local dealer, who also repairs unit. Road D—Batteries, metal tubing, valves, bolts and nuts, lockwashers, radiator hose, fan belts, pistons, piston rings, electrical material, headlights, gaskets, dome lights, miniature lamps, brake blocks and linings, timing chains, thermostats, heaters and parts, oil filters, springs, axles, connecting rod bearing, roller bearings, windshield glass, window sash, sign curtains, radiators, air brake parts, clutch facings, mirrors, counters and fare boxes, fire extinguishers, flare kits, mastipave and seats. Road E—Parts purchased from accessory manufacturers include headlights, bulbs, horns, batteries, ignition parts, switches, spark plugs, windshield wipers, carburetors, chains, piston rings and brake lining. Road F—Brake lining, piston rings, gaskets, oil and gas lines and fittings, ball and roller bearings.

Question No. 4—What guarantees, if any, are obtained for new equipment or repair parts?

Road A—No written guarantee. Road B—90-day guarantee, 5,000 mile limit. Road C—New Equipment—manufacturer's warranty of 4,000 miles or 90 days, whichever expires first. Parts—Whatever manufacturer's guarantee specifies. Road D—Most coach manufacturers guarantee all coaches to be perfect at least 45 days without any expense to operators. We have on various occasions called on manufacturers to make good when various parts have failed before giving us mileage expected. In some cases the manufacturer stands the whole cost, and in others each stands half of the expense. Road E—Manufacturers' defect guarantee, usually 90 days. Road F—Guarantee against defect in material or workmanship on most parts for average of 50,000 miles. Road G—We do not secure any written guarantees; purchases are, of course, made on the basis of defective material being replaced.

Question No. 5—On what basis are bus tires purchased—mileage or outright purchase?

Mileage in all cases reported.

Question No. 6—On what basis are truck tires purchased—mileage or outright purchase?

Outright in all cases reported.

Question No. 7—Has your experience with tire repairs proved that retreading of tires is a satisfactory practice?

Road A—No experience. Road B—Not recommended. Road C—No experience. Road D—Very satisfactory. Road E—Retreading of tires is not a practice, although some experiments are being made. Road F—Mileage contract does not permit retreaded tires. Road G—No experience.

Question No. 8—To what extent is gasoline purchased in (a) Tank cars? (b) Tank Wagon? (c) Filling stations?

Road —(a) None. (b) Largely. (c) Only where necessary, usually on account of isolated location. Road C—Delivery by all three methods. Road D—(a) 18 per cent. (b) 80 per cent. (c) 2 per cent. Road E—(a) 27 per cent approximate. (b) 70 per cent approximate. (c) 3 per cent approximate. Road F—(a) 60 per cent. (b) 35 per cent. (c) 5 per cent. Road G—Tank cars to the extent of about 90 per cent of requirements; balance in tank wagons, except some emergency from filling stations.

Question No. 10—To what extent is lubricating oil reclaimed? What process used?

Road A—Oil filter approximately 50 per cent. Road B—Ship to our shops. Road C—Do not reclaim. Road D—Reclaim all crank case drainings. Road E—Crank case oil is not reclaimed. Some experiments are being made with oil filters. Road F—All old oil reclaimed, using filtering pad system. Road G—Inasmuch as lubricating oil supply is maintained by additions from time to time, the quantity reclaimed is not very great.

Question No. 11—To what extent does your company reclaim used parts removed from vehicles under repair?

Road A—Parts costing \$10 or more are reclaimed when the saving makes it desirable. Road B—Where possible, according to our facilities. Road C—Majority not reclaimed. Road D—Weld chassis parts; connecting rods are re-babbited, ball bearings reground, thermostats repaired, transmissions are welded



with cracked or broken housings of all kinds, including crank cases, we built up main bearing supports and turn them in order to bring the crankshaft back in line, and repair all windshield cleaners. Road E—Secondhand parts are used wherever available. Road F—Such parts as cylinder blocks, cylinder heads, crankcases, crankshafts, housings, clutch plates, brake shoes are generally repaired. Road G—Mechanics at shop points reclaim any parts removed from coaches undergoing repairs wherever warranted. Parts so reclaimed are used in repairing other coaches.

Question No. 12—How much advance information does the storekeeper receive from the maintenance department of material required for unit overhauls so that the purchasing department may order the materials in advance of actual requirements?

Road B—10 days. Road C—Since our units are at scattered locations, we do very little work ourselves in the way of repairs. Therefore, material only ordered as needed. Road D—Storekeeper is supposed to receive 30 days advance notice from the maintenance department of material required for unit overhaul in order that the purchasing department may order materials in advance of actual requirements. Road E—Overhauls are usually done by outside firms as required. Road F—Program of overhauling is based on a definite schedule so that the storekeeper is able to anticipate requirements and order in advance. Road G—The mechanical department furnishes advance information as soon as the item or equipment has been inspected and a list of the material required made up. The stock is then checked and the necessary material ordered.

Question No. 13—Do you sell your old buses and trucks intact, or do you reclaim usable parts and sell remainder as scrap?

Road A—Traded in. Road B—Sold intact in most cases. Road C—Trade-in when a new purchase is involved. Road D—We never sell old buses, but turn in old trucks for allowance towards purchase price of new ones. Road E—Buses and trucks usually sold intact. Road F—Reclaim usable parts. Road G—In cases where buses are suitable for operating and can be disposed of intact to outside interests, this is done; otherwise, they are scrapped and usable parts reclaimed.

Question No. 14—In purchases of buses or trucks, do you have them delivered by rail or the highway? If the latter, why?

Road A—By rail. Road C—By rail. Road D—Most trucks have been delivered by rail, and coaches driven over the highway to break them in for revenue service. Road E—By rail. Road F—Accept delivery at factory and drive to our garages. Road G—All recent purchases of coaches have been based on delivery by highway at a stipulated sum per mile for drive-away charge. This has proved more economical and satisfactory than shipment by rail.

Question No. 15—Does the stores department keep records of parts issued to each bus or truck (so-called unit accounting for materials) thereby having complete actual cost records of materials used in maintaining each bus or truck?

Road A—Yes, but not as yet carried to that conclusion, but should and will be. Road B—Storekeeper reports to the auditor who handles final accounting to the units involved. Road C—No. Road D—Store keeps records of parts issued to each bus or truck, so a complete record cost of maintaining each of these vehicles is available at any time. Road E—No. Road F—No.

Road G—The accounting practice requires that all material be charged to each coach in detail and at the end of the month a complete record of all materials used on each bus or equipment is compiled and forwarded to the auditor.

The committee consisted of C. E. Smith (chairman), vice-president, New York, New Haven & Hartford; R. C. Harris, general storekeeper, Pennsylvania; J. H. Lauderdale, general purchasing agent, Missouri Pacific Lines; E. N. Pierson, assistant purchasing agent, New York, New Haven & Hartford; and E. S. Jamieson (chairman ex-officio), assistant general purchasing agent, Union Pacific.

The report was presented with extended remarks by the chairman, relating especially to the experience on the New Haven, which will be published in the Motor Transport Section of the regular weekly issue of the *Railway Age* of June 25.

F. McGrath (B. & M.): Will the original classification made up in 1930 and 1931 be discarded?

Mr. Smith: It will not be discarded but it will lie dormant with anybody that has less than \$10,000 of stock. Our maintenance of way department with 143 trucks more nearly represents what might happen on those railroads than our New England Transportation Company with all these bus and truck services, and yet on those trucks I am discouraging as much as possible the stocking of anything and asking the department to rely almost entirely on the local service agencies for trucks which are scattered throughout our territory. It is much easier to go to the local agencies for the standard truck material, and we try to get only standard material. We run a Ford truck about 40,000 miles, and we never let a mechanic open it up or fool with it. We call up the agency which sends a service wagon over to lift out the old motor, drop in a new one, and sends us a bill for \$59.

W. J. Sidey (L. V.): What type of equipment is used in reclaiming your oil?

Mr. Smith: We have three different machines in three different places.

Mr. Sidey: Do you put the reclaimed oil right back into all types of buses?

Mr. Smith: We do.

Mr. Sidey: Could you tell me approximately the cost of reclamation of the oil?

Mr. Smith: It is about one-third the cost of new oil.

Mr. Duvall: Has experience shown that 40,000 miles is about the right time to change the engine?

Mr. Smith: It varies. Some run a little longer. One ran 46,000 miles before the operator began to have trouble. Ford recommends taking the motor out at about 30,000 miles.

H. C. Ralls (M. P.): Do the tire companies require you to take an inventory of the tires on equipment in stock, and does this inventory develop any shortage?

Mr. Smith: They carry the inventory themselves and have a man at the garage who takes care of it.



Mr. Ralls: Do they carry the inventory by tire numbers?

Mr. Smith: Yes.

Mr. Ralls: Do they develop any shortage of tires through transposition of numbers or stealing of tires that you must pay for?

Mr. Smith: We have had a lot of adjustments because of abuse to tires: The motor bus operator may rip a tire on a curb. We have never had a case of a stolen tire, possibly because the big tires are not very easily disposed of. I presume if a claim came to me by the tire company that a spare tire on one of our buses did not come back, we would be responsible for it. The direct mileage is on record, and we pay for that. We pay for the unexpired mileage in the tire based on a list price and the average mileage we have been getting on that size of tire. The entire inventory is carried and managed by representatives of the tire company. The representative stays at our principal garages.

Mr. Ralls: Do you find it possible to make mileage contracts on an annual basis?

Mr. Smith: Yes. A new condition is arising this year. Heretofore contracts were made directly on an annual basis and at the end of the year the purchaser was free to make another contract with another company if he could get a better price. That was sometimes done and brought about the annoying con-

dition that two companies had to maintain tires. The company that had the contract in the past could either take their tires off and take them away, or carry them through on a declining payment. That was generally what was done. The new company would gradually build up their business. For years the tire companies have been trying to correct that, and last fall submitted a new form of contract which had a provision in it that at the end of the year it would be necessary for the purchaser either to buy the unexpired mileage on all the tires on the buses, or renew the contract.

That had a kickback in it, because if a company didn't have the money to buy a large number of tires at one time it would be possible for the tire manufacturer to write his own ticket as to the price. I set the matter aside figuring that others more persuasive than I would talk them out of that paragraph. In about two months, one by one the tire companies called up and said they were willing to sign up for another year without that clause. I think it gives us quite an advantage at the end of the year on the present basis. The tire company reaches the end of the year with a lot of tires on buses which it must either take off or continue unless they are renewed, or continued, on a declining payment. It puts the purchaser in a position to trade and trade hard for preferable prices for the next year, and we have saved a lot of money by doing that.

The report was accepted as read.

Report on Forecasting Material Requirements

Co-operation from users of material sought in planning supplies for program work—Plan of procedure outlined



G. O. Beale
Chairman

The success with which material requirements are anticipated has an important bearing on the successful administration of the purchasing and stores department. The organization, with its stock-book records and information obtained from time to time from officers of the using departments, is in position to forecast and order materials and supplies commonly known as stores stock items. It is obvious, however, that this department is not in position to forecast materials required for construction purposes, large maintenance programs, and materials required for improve-

ment which are chargeable to capital account, because it has no knowledge of the work to be performed nor the materials required for such work until plans have been developed by the using departments and approved by the management. It is necessary, therefore, that the supply department be informed by the using departments of materials required for such purposes.

Recommendations

1. It should be understood that control of all materials and supplies under the direct jurisdiction of the purchasing and stores department, until actually used or applied, is essential to intelligent forecasting.
2. It devolves upon the executive officer in charge of the department to collaborate closely with the officers of other departments for the purpose of obtaining first-hand information relating to contemplated programs, and he should be a factor in every decision that has to do with the use, procurement and disposition of material.
3. Stock records of the stores department should be considered the basis for ordering current requirements, supplemented by formal and informal contacts of local stores representatives with the supervisory officers of other departments.
4. A regularly-defined schedule of requisitioning current material requirements should be in effect.
5. Definite information of changes in programs for back-shop,

engine and car repairs should be obtained. Meetings of stock-keepers, or their equivalent, should be held at stated intervals, with representatives of using departments present, to discuss thoroughly the general material situation. These meetings will effectively assist in carrying out the principle of minimum investment. The current material situation may be clearly presented at these meetings and recommendations made for bringing about reduced investment in materials by the aid and assistance of the using department representatives, with the object of improving stock control, having in mind always the necessity for satisfactory service.

6. It is a well recognized axiom that both time and price are the essence of every contract or purchase. These two factors are essential in any intelligent plan of forecasting material. Therefore, the supply department must develop and pass on to the appropriate using department authorities information not only concerning the present, but also the future, affecting changing prices and deliveries.

7. The cost of carrying an unnecessary large stock of materials and supplies is one of the most important of the financial aspects of purchasing and stores. The greatest financial benefit comes from a minimum investment in materials. Therefore, the importance of close co-operation with the using departments, for the purpose of acquainting them with the material situation, is necessary for the proper control of the investment.

8. A representative of the supply department should be assigned particularly to all program and A. F. E. work where the magnitude of the work justifies, to control deliveries and to exercise the supervision over orders which may be necessary to adjust purchases quickly to changes in plans or to changes in progress of the work.

9. For the purpose of quickening deliveries, and thereby reducing stocks, material agreements should be made for the purchase of standard materials, wherever practicable.

Shop-Manufactured Material

The procedure above outlined will apply generally to material manufactured in railroad shops. However, orders for material manufactured in shops should be issued by the purchasing and stores department only after a careful investiga-



tion and thorough study has been made to determine the necessity and economy for manufacturing rather than purchasing in the open market.

The committee consisted of: G. O. Beale (chairman), chief purchasing and stores officer, Chesapeake & Ohio; C. D. Baldwin, purchasing agent, Bangor & Aroostook; Clyde Cocke, purchasing agent, Norfolk & Western; T. A. Hodges, general storekeeper, Seaboard Air Line; A. B. Lackey, division storekeeper, Southern; K. A. McDonnold, chief clerk to purchasing agent, Kansas City Southern; C. K. Reasor, assistant manager of stores, Erie; W. F. Redman, traveling storekeeper, Chicago & North Western.

Discussion

In the temporary absence of Chairman Beale, the report was presented by C. K. Reasor (Erie).

L. F. Duvall (A.C.L.) where the report reads: "It is necessary, therefore, that the supply department be informed by the using departments of materials required for such purposes," I would like to suggest that the wording be enlarged to include the words: "When such lists are received the supply department should carefully check quantities against the authorization and make sure the amounts specified are not in excess of actual requirements." Where the report reads, "Therefore, it is obvious that the using department is responsible for the forecasting of requirements, and the purchasing and stores department for obtaining and supplying the material as needed." I suggest the wording be changed to read: "Therefore, it is obvious that the using department is responsible for the forecasting of requirements and the purchasing and stores department for checking the quantities ordered and supplying the material as needed."

Mr. Beale: The two suggestions refer to materials being ordered for construction and special purposes. If the stores department is supposed to check the list given them by the using departments, it seems to me that if they order what they think should be ordered, then the stores department is substituting their responsibility for the using department. The using department is responsible for forecasting materials for construction and special purposes and the stores department should supply those materials. If they are too much, or too little, then the using department is at fault.

Mr. Duvall: It is all right if the using department would take that material, or take and use it for some other purpose. But the stores department is directly affected. Forecasts ought to be checked by somebody and the stores department is the department that should do the checking.

L. P. Krampf (M. P.): How would you have a representative of the stores department check an A. F. E. job as to the items and the quantities required? On a construction job the stores

department is not in position to check items as to the number required. If they build a station, the architect checks the number of items. If you have a service job, it is up to the service department. The committee has brought out that the stores department should check the items after they get the list, as to the amount that is being purchased, but there is no reason to think that a stores officer should check an A.F.E.

Mr. Duvall: Do you think, Mr. Krampf, there is any objection to our checking it? Don't you think it is possible for the department making the A.F.E. to put down the wrong figures?

Mr. Krampf: Yes, but I don't think you are in a position to do it. You have not the engineering knowledge, unless you are an engineer.

W. S. Morehead (I. C.): Mr. Krampf is entirely right when it comes to checking the items. On an A.F.E. job your estimates are made up for material and labor. By having the values of the material ordered for that A.F.E., you can often detect excess material by checking the values of the material as compared to the money allotted for the job. We do that and in a great many cases we are able to get the material reduced.

A. S. McKelligon (S. P.): In our department we are furnished with a copy of the A.F.E. or the G.M.O. The general storekeeper gets a copy and so does the Purchasing Agent.

Chairman Clifford: Maybe I should not enter into this discussion, but I think the stores department and the purchasing department should not exalt themselves to the point where they think they know more about an engineering job than an engineer.

C. R. Holmes (A. T. & S. F.): I think this report is all right as it is. I believe it is just a matter of good business on any job, whether it is an A.F.E. or an ordinary operating job, to check, if the stores department has the experience. We often call the engineering department's attention to errors in ordering material, and correct it.

B. T. Adams (I. C.): What the committee suggests, and also what Mr. Duvall recommends, is common practice on all railroads.

Mr. Beale: In planning a large program of car repairs, naturally it is necessary to know or find out by checking how many of those parts have to be renewed and how many can be reclaimed and reused. Don't you think that the using department, in that case, the mechanical department, is in a better position to judge how many of those roofs can be reclaimed than the stores department?

Mr. Duvall: They are in a position to, and they should check it. But the point is that sometimes they don't do it. Sometimes they guess at it. They do not make surveys. When the stores department comes down and says, "See here, you are going to order 500 roofs here. How many are you going to get from old cars?" they say, "Oh well, we think we will get 200." And then you ask, "Have you made a survey of the old roofs?" And they say, "No, we are just figuring on that." To bring another



thing up—They hand you an order and say they have to have this much plush to do some air conditioning. Well, someone comes along and says the stores department has nothing to do with that, that it is an air conditioning job. Therefore, the stores ought to keep its nose out of it. Later on the cars come in. You would think they would make a check of the plush. But 20 or 30 cars are in other shops. Maybe the air conditioning will be done at one shop, and at some other shop 10 or 15 cars will have already been equipped with that plush. The shop

making the air conditioning didn't take that into consideration, so the stores department gets the plush. The stores ought to check and question every item.

G. A. Goerner (C. B. & Q.): I reserve the right to check any A.F.E. job that I please, anything that the mechanical or operating department orders. But I do not think I would want to go on record saying that I am going to take their responsibility from them.

The report was accepted without revision.

Pricing and Inventorying Materials

Membership can't agree on best method of preparing bills for materials issued



C. B. Hall
Chairman

The committee reviewed previous reports and discussions on this subject. To obtain additional material for a final report, the committee was divided into sub-committees, which visited some railroads in adjacent areas, to develop, from the local standpoint, the questions of economy and accuracy of the two methods of pricing. This survey, and information obtained from other railroads through one of the regional stores group meetings, showed that the railroad roads canvassed were about evenly divided between those using the direct

system of pricing and those using the book, or indirect system of pricing. In several instances the direct pricing system was in experimental use or being studied.

The committee's surveys and discussions indicated lack of uniformity in the application of detailed principles under both

Chicago & Eastern Illinois; H. B. Akin, acting general storekeeper, Canadian National; G. J. Hunger, traveling material supervisor, Atchison, Topeka & Santa Fe; C. A. Nichols, assistant general storekeeper, Northern Pacific; G. W. Scott, district storekeeper, Missouri-Kansas-Texas; J. W. Watkins, assistant to general storekeeper, Lehigh Valley; L. P. Krampf (chairman ex-officio), supply agent, Missouri Pacific.

Discussion

The discussion of the report was postponed until special papers on the subject had been presented.

J. V. Miller (C. M. St. P. & P.): As one of the legal parents of the brain child of bin pricing, now known as direct pricing, we have a right to suggest to the committee that the child will be 21 years old in 1943. This child belonged to us until 1927, and since that time has 22 adopted parents. During that time only one parent temporarily resigned from his duties. It was done against the objection of practically all of his men, and a few years later he came back as one of the parents. We who



systems. It was also determined that there were available no reliable comparative figures from which the greater economy of either scheme could be definitely shown. The proponents of each method seemed firmly convinced not only of the economy, but of the accuracy of the plan being followed. The committee is not able to recommend the adoption of one method to the exclusion of the other. The committee suggests that the recommendation of the 1935 committee report be continued.

Inventory

For inventorying material and supplies, some railroads use stock books or stock cards, in which columns are provided for inventory count, price and extension. Other railroads list the material on sheets, while others use separate inventory cards which can be used for a number of years. The inventories are, however, taken under instructions issued by the accounting department and, to simplify present methods, it is recommended that the subject be assigned to a joint committee with the Accounting Division.

The committee consists of: C. B. Hall, (chairman), stores manager, Pennsylvania; B. T. Adams, district storekeeper, Illinois Central; L. J. Ahlering, purchasing and stores agent,

have tried the direct pricing would not go back. The opponents of this system have not tried it. There are a number here who have been going to come to see us for the past 6 or 8 or 10 years, yet they have never arrived. We have taken a lot of time in the past 10 years on this, and the committee should not be perpetuated. A committee should make a recommendation either to adopt it as a standard practice or drop it.

C. R. Holmes (A. T. & S. F.): We have tried it on the coast lines of the Santa Fe for the past five years and we want to go back to our price book prices. With no price clerks, on material returned to stock, where there is no similar material on hand, how and where can one obtain the price? I am referring to new material bought for a job and not used.

B. T. Adams (I. C.): We certainly have a record of it if it is bought. It is on our invoice and requisition.

Mr. Holmes: You have to get the order and invoice number and go back to it.

Mr. Adams: I assume you agree that it would not be an hourly or daily occurrence.

Mr. Holmes: It is too frequent. Recently the auditors checked 950 entries in our price book without finding a mistake. They checked the distribution and developed several mistakes on the stock, although our stock men are as good as any on any road,

but we find we can do the pricing so much faster from a price book. A man out in the weather, with a requisition for a dozen items has to stop and find a shelter in order to put the price down. We also have centralized accounting. All the transfer invoices now have to be priced but under the price book plan they would not have to be priced. The requisition comes into the head store and is priced from the price book. We see no difference in our inventory adjustments and I think the biggest adjustment we ever had was located, and pricing had nothing to do with it. We would like to go back to the price book plan.

Mr. Adams: You said something about this man out in the weather who couldn't put a price on the ticket? What do you do in the case of castings or items that you have to put a description on—don't you have to add the weight?

Mr. Holmes: The stock man puts it on in some cases and we also have it in the price book.

We have a great many of our castings under cover in the storehouse.

The report was received without further discussion.

Direct Pricing — For and Against

Debate held to settle dispute over best method of pricing material issued from storehouses

A virtual deadlock developed in the Division between factions favoring the practice of having material priced by stockmen from records or bins as the materials are received from storehouses, and factions favoring the continuation of the practice of performing all material pricing in the office through the medium of price books or price cards in charge of price clerks, and it was decided to supplement this year's report of the committee on direct pricing with two papers on direct pricing, one in the affirmative and one in the negative. In this debate, which was held at yesterday's meeting of the Division, B. T. Adams, district storekeeper, Illinois Central, took the affirmative position and W. F. Redman, traveling storekeeper, Chicago & North Western, took the negative position. Their papers were in part, as follows:

Affirmative



B. T. Adams

Direct pricing differs from office pricing only in the application of the prices to the various items of material and supplies received and issued.

The method employed for determining the unit price of each item of material—either under the direct or the office pricing system—is to have the invoice, with freight or express bill attached, calculated on a comptometer and the unit price indicated on the face of the invoice for each item. Under the office pricing plan, the invoices are referred to a price clerk who enters the unit prices in a price book or on

a price card kept in the office. The usual method under the office plan is to apply the last or current prices to such issues. Under present conditions, with prices increasing steadily, it can be seen how this affects stock balances and inventories.

Actual Prices Used

Under the direct pricing method, invoices are calculated by a comptometer operator and the price shown on the face of the invoice in the unit in which the material is commonly issued. These invoices are separated according to material classifications and sent to the section stockkeeper in charge of that particular class of material, and the prices are applied by the stockkeeper or stockman to the bin labels or to the items. Actual prices are applied to the material and the separation can be carried out as far as necessary by using separators or containers to distinguish each lot received at different prices.

Pricing Material Tickets

Under the direct pricing system, the prices are applied to the shop material tickets at the time the material is taken from the storage bin or platform, and these material tickets under such a

method do not have to be sent to the office. At large points, considerable clerical work is constantly saved by not having to price each ticket in the office. The delivery men or counter men in the storehouse can apply the prices to such tickets without detracting from their other storehouse work.

The transfer bills are also priced by the stockman who prepares the material for shipment, as he has the transfer requisition in front of him at the time he removes the material from the shelf or platform and the price is immediately posted in the space provided on the transfer requisition for it. The handling of material tickets and transfer requisitions in any office where the office method of pricing is employed involves considerable clerical work in the office, which is entirely eliminated under the direct pricing method.

Delivery of Material to Shops

Where material is delivered to shop forces at the point where the material is to be used, the delivery man, who is a store department employee, applies the prices to the material tickets as he takes the material from its storage place. He is qualified to apply the proper price when the item is taken from the shelf and the ticket does not then go to the office for a clerk, usually without storehouse experience, to look through catalogs to apply the price. It does not require additional delivery force to apply these prices to these tickets and economy is instantly reflected.

Budgeting Purchases

On some railroads, a budget is prepared for material purchases, and where this is done, the direct pricing plan is of great assistance, as the prices can be posted in the stockbooks at the time the material is counted by the storehouse attendant. This will also provide a price record of the material, as the stockbooks are filed away indefinitely for reference in connection with the quantity of material purchased or used during any given year or for other statistical purposes.

When the requisitions are written on the combined requisition and purchase order form, the operator of the fanfold machine or typewriter, who types the requisitions, can place the value of the material in the proper unit on the approval copy and a comptometer operator can compute the value of requisitions for budgeting purposes without referring all of these requisitions to a price clerk to be priced, item by item, which would be necessary under the office system of pricing.

Inventories and Direct Pricing

The direct pricing system is of decided advantage to the storehouse at the inventory period, as the material is priced from the bin labels or from the price shown on the larger items where stored on platforms at the time that the quantity is listed, either on inventory sheets, inventory cards or in the stockbooks, according to the method used for listing the material.

Under the office method it is necessary to go through the same procedure of listing the material in the storehouse and

then the great volume of inventory sheets or cards have to be sent to the office where the prices are inserted, item by item, from a price book or price card system. The direct pricing system makes it possible to state the inventory results much sooner than under the offer price method and reduces the work in the office largely to a calculating machine operation.

Experience has not as yet developed any location on the railroads, where the pricing of material is necessary, that the direct pricing plan cannot be employed. It can be used at a general storehouse where 200 or 300 men may be employed, at a division storehouse where 50 to 100 men might be employed, at a local storehouse where 1 to 10 men might be employed.

Economy of Direct Pricing

At a large storehouse where the annual amount of material purchased and received by transfer for the year 1936 was \$11,326,000, the cost of figuring the unit price by calculating machine, plus the application of the prices to bin labels or material in the storehouse or yards by stockkeepers or stockmen, amounted to \$0.103 per thousand dollars, and at that particular storehouse, there were no price clerks involved and the direct pricing plan has been used for a period of six years.

Where prices are shown on the bin labels or items, they are brought out in the open and give the entire storehouse, as well as shop organizations, the benefit of knowing the value of the material handled and used. The pricing of the material undoubtedly encourages the economical use of it. When an employee knows the value, he will be more considerate in the ordering and use of it. The placing of the prices on bin labels and items brings them constantly to the attention of the storekeeper, foreman and others in a supervisory capacity and insures that they will be kept up, as a missing price immediately brings it to their notice.

Negative



W. F. Redman

Last year's committee reported 17 advantages of the direct pricing method. I shall take up each one in the order named.

While it may be desirable to do the pricing in the stores department (and many roads not using direct pricing methods do so either at various division points on their system or in a centralized bureau), other roads have all pricing done in a centralized bureau in the accounting department. When the class, page and item number are shown on material charge tickets, the tickets can be readily

priced, even though the description of the article is improperly written or incompletely described.

Would Require More Work

As the direct pricing operations would be distributed over a greater number of employees, the fact still remains that they would consume considerable time in posting prices; also in checking new prices of material from invoices when received and making the necessary changes from time to time. It is possible that some clerical work in offices could be reduced by direct pricing. However, it would be necessary for most roads to maintain a clerical force in connection with the pricing, such as figuring freight charges to be added to each unit of material, also discounts. The pricing of estimates on A. F. E.'s would remain, and it would be necessary to price disbursements for such items as lumber, material on line, track material and supplies, and many other items in the hands of section forces, water supply and bridge and building departments. Many roads have a number of outside points where material is carried in stock and where no store department representative is employed. Such material is ordered and maintained by the mechanical department, which could not be expected to do direct

pricing and also make necessary corrections of this method or pricing from time to time.

The theory that all material shipped to outside points would indicate the price on each article, and all that would be necessary when the article is used would be to have the man in charge insert the price on the ticket, is impractical. There are so many items used that it would entail too great a labor charge to mark or tag the price on each individual piece before shipping to such outside points. It would also be very costly if such material tickets were forwarded to the source of supply to be priced under direct pricing methods, for they would have to be sorted for each section stockkeeper and he would be obliged to go to like material carried in his stock in order to apply the prices.

No Increase In Accuracy

There are many items of material carried in stock to which it would be impractical or very costly to affix prices, such as various kinds of lumber, sheet steel, bar iron, pipe, forgings, rough castings, etc. It would therefore be necessary for the stock clerk to maintain a record of some kind in his office for such items. After requisitions are filled, he would be obliged to price from this list. Price clerks are able to price this material more readily from price books in the office.

Pricing Annual Inventory

If direct pricing of material will facilitate the pricing of annual inventory on all material that has the prices shown, there would still be a number of items on which prices would have to be applied after the inventory is taken. Roads that prepare their inventory sheets in advance of the actual inventory have them written up in accordance with the stockbooks and A.A.R. classes, and much of the inventory can be priced somewhat in advance of the date to be taken. This work can be performed just as efficiently by a price clerk who has his price books before him. He is also in a better position to apply prices on material on which freight charges must be added, as well as shop-manufactured items covered by shop orders where labor, material, shop expense and other items must be considered in the price.

Requisitions from outside stores sent to the source of supply have the class, page and item number given, and this can be priced by the price clerk after the order has been filled. Prices in price books are also arranged in classes, with the page and item numbers shown, for ready reference in pricing; and this eliminates possible errors in pricing. There is a possibility for error in filling the material ticket that is not completely described, by showing the wrong page and item number. However, this same order filler might make an error in putting incorrect price on the same ticket under the direct pricing system.

When it is necessary to have costs of material in advance in order to determine the expenditure for certain classes of work on locomotives or cars, it is necessary to have a list of the principal items required. The prices of various items could be more readily obtained from price books in the office. Under the direct pricing method it would be necessary to pass this list around to various stockkeepers to go to their racks and put the prices on the items shown on the list.

Knowledge of the cost of an article may have its merits when the material is delivered to the user. However, the average user of material is mostly interested in the work assigned to him, and the price or cost is secondary. Better results are obtained by giving this information to the foreman or supervisor. Material is only issued on orders from him, and, as he is responsible for the cost of repairs, he would consequently be interested in keeping his costs to the lowest possible amount.

There are many items on which the actual price can be shown under the direct pricing method, but to accomplish this in its entirety would be difficult. Items of like material purchased at various times and at different prices would have to be segregated, and often the allotted space in racks would have to be rearranged to do this. In writing inventory, several spaces would have to be allowed for each item, in order to price at the actual price.

If average prices were to be used on all material, it would entail a great deal of clerical work. However, it is necessary

to compute the average price on such items as timber, lumber, certain castings, bar iron, sheet steel, etc. While this may entail some clerical work, it would be less costly than attempting to put individual prices on each item of this class of material.

Inventory adjustments are not primarily made because of the method of pricing. While price fluctuations may have some bearing upon inventory adjustments, there are other factors which must be taken into consideration.

With price books or the price card system in effect, the price clerks can readily locate prices from their records, and the direct pricing method would tend to encourage memory pricing, especially when orders are filled hurriedly and priced later. This would also be particularly so at points where no store department employee is on duty at night or on Sundays and holidays and the material is drawn out by the foreman of the using department.

Report on Purchasing Practices and Records

Office methods designed to save time and labor described
and their increased use advocated



Moffett
J. F. McAlpine
Chairman

The purpose of the requisition-order system is to eliminate the rewriting of purchase orders from a previously-typed requisition and produce other savings. Some of the railroads using the system are the Boston & Maine; Chicago, Burlington & Quincy; Chicago, St. Paul, Minneapolis & Omaha; Chesapeake & Ohio; Central of Georgia; Colorado & Southern; Illinois Central; Lehigh Valley; Maine Central; Pennsylvania; St. Louis-San Francisco; Union Pacific; and Erie.

Advantages

Operations in the storekeeper's office that can be eliminated are the inserting of the firm name, order number and date on the requisition, and the checking of items on the orders against items on requisitions. The purchasing office can eliminate the writing of the order from the requisition, checking items on the order against items on the requisition, errors in quantity and description that may occur in rewriting, requisition files, loss of time in placing orders on vendors, requisition forms and carbon paper and binders, and can reduce typewriter equipment, desks, chairs, etc.

The storekeeper is vitally interested in the lapsed time between the date he needs material and the date his order is placed. By the use of this method of ordering, the time is reduced to a minimum. Attention is called to the use of the hectograph and addressograph plates in making requisitions, permitting the order and all necessary copies to be made on a duplicate machine.

Example of Procedure

To better illustrate the requisition-order method of ordering material, the following describes the procedure on a Class I railroad.

Preparing Requisition-Order.—The requisition-order is type-written direct from the stock book at stores on standard requisition-order fanfold forms. Form 12-4 goes to dealer. Form 12-4a is the purchasing agent's invoice and voucher record of the purchase order, which is also a requisition. Form 12-4d is the stores department's record of material received. Form 12-4e is the stores department's record of purchased material in the invoice record. Form 12-4f is made only when inspection of material is required. All copies are written at one time and show the following information:

(1) Number. The method of numbering requisition-orders is such as is mutually considered most satisfactory to the purchasing and stores department. The number as shown by the storekeeper on the requisition is also the order number and is used on the inquiry or any other form pertaining to the requisition. (2) Number of sheets to requisition. The requisition number is not restricted to one set of requisition-order forms but may be used on several, where like material is being ordered, a maximum of 10 sheets being permissible. (3) Sheet number of requisition. (4) Material classification (except on Form 12-4).

(5) Dealer's name and address, when known. (6) Consignee and destination. (7) Quantity to be ordered. (8) Complete description, and catalogue reference where necessary. (9) Quantity on hand, due, holding orders for, and used past 60 days (except on Form 12-4) shown in parenthesis. (10) Approval by storekeeper.

Forms 12-4d, record of material received, and 12-4e, record of purchased material (invoice record), are retained by the storekeeper. The number of copies to be forwarded to the general storekeeper varies, depending on whether or not the material is to be inspected, etc. Prefix and suffix letters are a part of the requisition number which will also be the order number. The prefix letter designates the ordering store. The suffix letters show the year in which the requisition-order was made and the section in the storehouse to which the material should be delivered.

Handling in General Storekeeper's Office: Requisitions are forwarded to the general storekeeper's office by the storekeeper, where the description, quantity ordered, etc., is checked, also as to whether the material might be furnished from surplus stock at some other store. After these checks have been completed, the requisition is approved by the general storekeeper and forwarded to the purchasing agent.

Requisitions, Receipt and Handling: The routine of the purchasing agent's office begins with the receipt of a properly-approved requisition, transmitted through the office of the general storekeeper. The usual system in obtaining quotations, etc., is followed.

Requisitions, Marking or Awarding Business: In marking requisitions, the name of the seller is shown on requisitions. This information is available from the standard form of inquiry, from the record of quotations or contracts or other arrangements approved by the purchasing agent for future purchases, or from the record of quotations received by telephone, telegraph or personal solicitation. Requisitions may also be marked to sellers or manufacturers without quotations, such as repairs to or repair parts for machinery, etc., where it is not practicable to obtain advance quotations.

Preparing and Issuing Orders: The forms for this purpose are designated as Number 12-4 - Order Form - and 12-4a - Invoice and Voucher Record of Purchase Order. The purchasing agent's office inserts dealer's name and address, when not shown, also the date, on Forms 12-4, 12-4a, and 12-4f, when required. When this operation has been completed, a separation occurs between the requisition and the order, Form 12-4 becoming an order, and Form 12-4a, a copy of the order as well as the requisition. Form 12-4 is mailed to the dealer and Form 12-4a is retained in the purchasing agent's office. Form 12-4a - Invoice and Voucher Record of Purchase Order for recording invoices, has spaces for the order number, date and firm name; also for the information to be taken from the invoice, showing the quantity, price, trade discount, freight allowed, cash discount, invoice (amount and date), amount of invoice as vouchered (if invoice is cash discounted), voucher date or number and car initials and number.

Filing Copies of Orders: Copies of open orders are filed in loose-leaf binders in numerical order, no separation by the requisitioning store being necessary. Completed copies of orders

are removed from binders and filed alphabetically by firm name. These may be filed in numerical order under the firm name, but it is not felt that sufficient good is gained to warrant the additional expense. After sufficient time has elapsed and the year's orders have been completed, these are bound and placed in permanent file.

Invoice Checking: Invoices on which a cash discount is allowed are sorted for special payment. The invoices are checked to insure correctness of all details, and after verification of prices, etc., are sent to the proper party for verification as to receipt of material.

Invoice Record: Since the Form 12-ra, which is the requisition, serves as both a copy of the order and an invoice record sheet, no other record is necessary.

Release Order System

One of the most productive sources of purchasing office detail lies in the repeated ordering of small items. Some railroads have found it desirable to permit the general storekeeper to release certain material and shipments direct with the manufacturer through the medium of release orders. These release orders cover items specifically listed by the purchasing department, showing the prices to be paid and on the regular order form. This method has been found effective, particularly where general stores are located some distance from the purchasing department, in the prompt replenishment of stock and also in keeping down to a minimum the general working stock of local and general stores.

Price Record

The conclusion of this committee is that the recording of prices on loose cards in file cabinets or recording prices in a bound price book are not desirable, and that the visible index price card and also the visible loose-leaf price book both have equal merits.

The committee consisted of J. F. McAlpine (chairman), assistant purchasing agent, Chicago, Burlington & Quincy; F. E. Driscoll, purchasing agent, Erie; J. W. Hagerty, general supervisor purchasing department, Pennsylvania; C. B. Hanover, chief clerk to purchasing agent, Chicago, Milwaukee, St. Paul & Pacific; J. H. James, purchasing agent, Pittsburgh & Lake Erie; M. C. Nystrom, assistant purchasing agent, Southern Pacific; C. R. Painter, purchasing agent, New York, New Haven & Hartford; A. A. Taylor, assistant general purchasing agent, Missouri Pacific; M. L. Tynan, general purchasing agent, Railway Express Agency; G. T. Wickstrom, assistant to general purchasing agent, Union Pacific; E. M. Willis, purchasing agent, Northern Pacific; E. J. Lamneck (chairman ex-officio), purchasing agent, Pennsylvania.

Discussion

In the absence of the chairman the report was presented by E. J. Lamneck (Penna.).

W. L. Wheeler (C. & N. W.): Does the requisition order form go directly from the division storekeeper to the purchasing agent through the storekeeper, or do you limit the making of the requisition order form to the general storekeeper?

Mr. Lamneck: It can be made by anyone who originates a requisition. If it happens to be the division storekeeper, the division engineer, or anyone, it will be made right there.

Mr. Wheeler: When a requisition originates with the division engineer or the maintenance department, can it be transmitted to the general purchasing agent without being rewritten?

Mr. Lamneck: We think so. There is no one better able to describe what they actually want than the man who is making up the requisition.

H. M. Rainie (B. & M.): We are actually carrying that out and getting the using department, where it is necessary for them to originate a requisition, to write it on the combined requisition-order form. This sample order is interesting but in some instances it is not very clear. I am hoping that before the railroad who made up this requisition form actually

puts it into practice they will survey the different methods in effect on the various roads, and not be guided entirely by the one set up. It is slightly complicated, due possibly to local conditions on the particular road involved.

S. A. Hayden (M.-K.-T.): The report states that it requires no longer time or greater effort on the part of the stores department to write the purchase order at the same time the requisition is written direct from the stock book. Our experience has been just the opposite. We find it does require

NORTH & SOUTH RAILROAD COMPANY
CHICAGO, ILLINOIS
OFFICE OF PURCHASING AGENT

Form DVI-12-4

(Dealer's name and address, also date shown in office of Purchasing Agent)

Please ship to the NORTH & SOUTH RAILROAD COMPANY Via Freight
Care of Storekeeper M-2222-BX Chicago, Ill.
The material specified below. Receipt via N. & S. R.R. from justice amount to point of shipment.
Certified shipments must be made in N.A.S. equipment. Low carload shipments regardless of weight, originating at points on N.A.S. must be shipped via freight unless otherwise instructed. Shipments weighing less than 100 lbs. originating at points not on the N.A.S. should be forwarded by express or parcel post, depending on lowest rate, if the charges are less than minimum freight charges. Do not prepay any freight, ship with charges collect and deduct freight allowance, if any, from face of invoice. No charges will be allowed for packing or crating.
THIS ORDER IS GIVEN AND ACCEPTED SUBJECT TO CONDITIONS APPEARING ON THE BACK HEREOF

2000	W. A. B. 2279 hose coupling gaskets (1 in. 1 1/4 in. and signal hose couplings, Spec. 86-B Grade 1-V)
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INVOICE & VOUCHER RECORD OF PURCHASE ORDER

Class 22 Sheet 1 of 1

Ordered from: (Dealer's name and address, also date shown in office of Purchasing Agent)

Shipped to: Storekeeper M-2222-BX Freight Chicago, Ill. Order No. M-2222-BX

POSTED IN RECORD				INVOICE		INVOICE (as Voucher)		CAR	
QUANTITY	PRICE	DISCOUNT	Freight Allowed	Amount	Date	Amount	Month	Initials	Number
2000	W. A. B. 2279 hose coupling gaskets (1 in. 1 1/4 in. and signal hose couplings, Spec. 86-B Grade 1-V)		3000	0	3000	P-31 L-4			
2000	31.00	80		31.00	1/4				
				M					

STORES DEPARTMENT RECORD OF PURCHASED MATERIAL

Class 22 Sheet 1 of 1
Req. No. M-2222-BX

Ordered from: (Dealer's name and address, also date shown in office of Purchasing Agent)

Shipped to: Storekeeper M-2222-BX Freight Chicago, Ill.

RECEIVED		INVOICE		FREIGHT CHARGES		INVOICE	
Quantity	Date	Date	F. O. B.	Miscellaneous	Per. No.	Amount	Per. No.
2000	W. A. B. 2279 hose coupling gaskets (1 in. 1 1/4 in. and signal hose couplings, Spec. 86-B Grade 1-V)						
		3000	0	3000	P-31	L-4	
2000	3/20	3/15	Chicago	31* M 50%			31.00 3/20

STORES DEPARTMENT RECORD OF MATERIAL RECEIVED

Class 22 Sheet 1 of 1
Req. No. M-2222-BX

Ordered from: (Dealer's name and address, also date shown in office of Purchasing Agent)

Shipped to: Storekeeper M-2222-BX Freight Chicago, Ill.

STOREHOUSE CHECKING				WAYBILL CHECKING				REMARKS	
Received	Checked in	Freight Charges	Waybill	Car	Packages				
Quantity	Date	1915 C. S. B. B.	Station	Date	Number	Initials	Number	Kind	Weight
2000	W. A. B. 2279 hose coupling gaskets (1 in. 1 1/4 in. and signal hose couplings, Spec. 86-B Grade 1-V)	3000	0	3000	P-31	L-4			
2000	3/20	R	S	Chicago	3/15	723	Q	128668	1 Box 15

Requisition Order Forms—Top to Bottom: Order on Dealer, Purchasing Department Copy, Store Department Copy, Store Department Receiving Record

more time of the stock clerk and particularly of the typist, and we haven't convinced ourselves that we can go to the purchase order requisition method without incurring additional expense by adding to the stores force and without making compensating reductions in the purchasing department. In making an investigation with a view to adopting the requisition order method, we analyzed four prominent classes. We had been handling those classes under our regular requisition system. In one month we prepared 14 requisitions consisting of 90 sheets, against 187 purchase orders that had been placed. Had we placed it under the requisition order method those 14 purchase requisitions would have meant 187 files for the storekeeper to maintain. Instead of 90 sheets, there would have been 187 sheets. The storekeeper and the general storekeeper would have had to scrutinize and sign 187 requisitions or sheets, instead of 90. Applying this

same ratio to other classes of material, we concluded that the additional work the stores would have to take on would increase our expense at the stores to such an extent that it couldn't be done without adding to the force. We use the release order system on approximately 41 per cent of the regular stock added to the material that we order, and that leaves us to handle under the requisition order method only the more difficult items. In buying the material which we can't handle under the release order system, the purchasing department prepares bid sheets carrying the same general description as appears on our purchase requisition prepared by the stores. Perhaps the purchasing agent's force could write those orders at the time they prepare the bid sheets, on the great bulk of material, rather than place an additional burden on the storekeeper or his office force, which he can ill afford to assume with the limited force at his disposal. It would expedite the work in both the purchasing agent's and the storekeeper's office, if the orders could be written at the time the bids are submitted.

W. R. Culver (C. & O.): When we adopted the direct requisition, it did entail considerably more work, but in the refinements we have been able to make in the last few years the work has really been reduced.

O. A. Donagan (B. & M.): We borrowed the combined purchase and order form from the Chesapeake & Ohio. When we put it into effect in the stores department we did not encounter any increased cost. On the other hand, in the purchasing agent's

office a reduction in payroll expense was effected. We have been working under this system now for about 8 or 9 years.

W. W. Griswold (W. & L. E.): At the present time, our cost of procurement of material, from the time the requisition is prepared and sent to the purchasing department until the material is procured and delivered to the store house, is one-seventh what it was in 1931, before we adopted this method.

A. N. Laret (St. L.-S. F.): We have been using that form since 1927. I have asked our general storekeeper on many occasions whether there was any additional cost involved and he has told me absolutely not. As far as the purchasing department is concerned, we made a reduction of one order writer and, besides, our orders are getting out quicker.

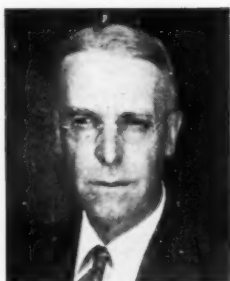
G. A. Goerner (C. B. & Q.): We are using the direct order system. We write perhaps 15 per cent more requisitions than we would write if we did not use the direct system, but it does not cost any additional money. It has meant a big saving in the purchasing department. We made a test about six months ago and found that we are re-copying about 15 per cent of the requisitions and the increase in work at the store in writing the orders was about 15 per cent.

G. E. Scott (M-K-T.): Let me call particular attention to the statement made that we were perhaps making unusual use of the blanket release order. To supplement our work and employ the requisition order system, we did not see where we could gain any advantage from it.

The report was received as presented.

Report on Maintenance of Way Materials

New Committee would tighten supervision, charge out certain items when shipped, and standardize secondhand materials



Frank McGrath
Chairman

Recent material stock reports submitted to the Division show that the total maintenance of way and construction material balance as reported approximated \$118,495,250, which represented 41 per cent of the total investment of the carriers in materials and supplies. The balance does not include scrap materials or material carried on line for joint usage.

Ordering and Maintaining Stocks

The committee recommends that rail, ties, maintenance of way and construction lumber and A.F.E. materials

be ordered on the basis of studies made by the engineering and construction departments. Materials for current use should be maintained in stock by the supply department on the basis of consumption, with regard to the season of the year. The quantity of materials to be reclaimed or repaired should be governed by the supply department.

All unapplied materials, regardless of location, should be policed by the supply department until actually used, and the surpluses disposed of as recommended by that department.

Reports obtained by the committee indicate a lack of uniformity in the method of describing materials ordered by maintenance of way and construction departments, and it is recommended that stock-book sheets, or a descriptive list, be issued showing complete descriptions and item numbers, by classes, for all maintenance of way and construction materials, and copies forwarded to the heads of all departments ordering such material, and requisitions and orders prepared in accordance therewith. Some railroads have such a system in effect, and the results obtained justify this recommendation.

Disbursements

Exceptions are proposed to the general rule that all unapplied maintenance of way and construction materials, including materials

on outfit cars, should be carried in "Materials and Supplies Account 716," until actually applied. Certain materials, when shipped to using departments or furnished to outfit cars, should be charged direct to primary accounts, thereby reducing the accounting. These items have been selected on the basis of the nature of the material and the impracticability of being certain that individual disbursement orders will be received, when used. These materials are: small tools and supplies; gasoline, oils, greases and waste; repair parts for motor, hand and push cars; repair parts for rail lubricators; repair parts for roadway machines; tie plugs; gravel, sand and stone; salt; shims and shim braces; shim spikes; cotter pins; switch, frog and guard rail bolts; crossing compound; signs of all kinds; small parts for pumps; repair parts for scales; repair parts for derricks and coal cranes; cables for equipment; canvas, rags and toweling; hose and fittings; belt; rope; paint and wire brushes; alcohol; dating nails; common nails for section foremen's use only.

Direct Shipments

Considerable savings have been made in distribution costs during the past few years by direct shipment of bolts, frogs, switches, guard rails, salt, shims, etc., from manufacturers to the point of use. Where direct shipments from manufacturers are not economical or practicable, such shipments should be made from a central store. During the past few years, a number of railroads have discontinued operating supply trains. Protective stocks of such items as frogs, switches, switch stands, guard rails, emergency bridge timber, telephone, telegraph and signal material, etc., should be established in conjunction with the engineering department, but should be maintained by and under the jurisdiction of the supply department, and rechecked periodically for reductions or increases.

Classification of all maintenance of way scrap should be handled by the supply department. Usable material should be picked out on the line, and not sent to store headquarters, unless it is surplus. When bridge and building, paint, and other line outfits are discontinued for a temporary period, the material should be left in the cars. When discontinued indefinitely, the material should be returned to the stores. Surplus materials for

seasonal work should be returned to stores stock at end of the season.

The committee recommends that efforts be made in conjunction with accounting officer's representatives to establish a uniform method of valuing released maintenance of way and construction materials, including relay rail. Where separate prices are used for new and second-hand materials, the second-hand materials should be properly marked to distinguish from new materials.

The committee consisted of Frank McGrath (chairman), traveling storekeeper, Boston & Maine; C. A. G. Blomquist, stores accountant, Central of Georgia; K. P. Chinn, assistant general storekeeper, Texas & New Orleans; W. B. Hall, purchasing agent, Denver and Rio Grande Western; J. L. Quarles, district storekeeper, Chesapeake & Ohio; W. P. Stewart, supervisor of scrap, Illinois Central; A. L. Sorensen, (chairman ex-officio), manager of stores, Erie.

Discussion

B. T. Adams (I. C.): Where the committee says, "The quantity of materials to be reclaimed or repaired should be governed by the Supply Department," I assume that it refers to unapplied materials, and would suggest the word "unapplied" be added, and where the report says, "All of these unapplied materials, regardless of where located, should remain under the policing of the supply department," I recommend that it read that all of these unapplied materials be in the custody of the supply department.

Mr. McGrath: We have no objection to substituting that wording.

Mr. Adams: In connection with the recommendation about material shipped for the using departments, such as repair parts for motor and hand cars, push cars, etc., I assume what is meant is that where a part is sent out for an individual machine it should be charged out and not to the shop where these items are carried in stock.

Mr. McGrath: Yes, where this goes out for an individual machine to be repaired.

E. G. Petersen (Bang. & Aroos.): The committee recommends charging direct to primary accounts a certain number of items. That is all right, but at annual inventory, are those items brought back to get a credit on Account 716?

Mr. McGrath: If they were charged out they would not be taken back on the annual inventory.

Mr. Petersen: We take it back at inventory time and it remains a frozen item until the next annual inventory. Of course, there is inventory adjustment. If it is over, you get an inventory overage, but nevertheless Account 716 is an asset on the books and should be inventoried.

C. B. Hall (Penn.): Where it says that the certain materials should be ordered on the basis of a study made by the engineering and construction departments, does this contemplate that the study will be made in conjunction with the supply department?

Mr. McGrath: That is correct.

Mr. Hall: You have recommended that all maintenance of way scrap be classified out on the line. Our experience has been that our maintenance of way forces are somewhat depleted, and we can get better results by shipping it in to a central point than by having the separations made locally.

Mr. McGrath: Wouldn't credit already have been given to the using department for that material that had been retired before you get it back?

Mr. Hall: No, it would be taken out as scrap.

A. L. Sorensen (Erie): The intent was that we are trying to keep good, usable material from coming in with scrap. Eventually, all scrap will find its way to the scrap plant except scrap rail. Usable material should not be sent in with scrap, to the extent that many railroads have found that in cleaning up the railroad they clean up everything, and then a few weeks later they want the usable materials back. We want to keep the usable materials from going in, and then back again to use.

Mr. Hall: Are the forces out on the railroad fully qualified to determine what can be reused?

Mr. Sorensen: It was not intended that they should. The intent was that that should only be done at the scrap plant.

(The report was received without further discussion.)

Report on Purchasing in Standard Packages

First studies to develop national standards for bulk buying described and 134 proposals made



Wesley A. Clem
Chairman

The advantages obtained by adopting standard packaging of materials are facility of handling, reduction of time in checking and counting, elimination of repacking costs, time saved in stock inventory, better protection of material, quicker filling of requisitions, reduction in breakage between stores, and improved opportunities for using available headroom space in shelves and minimizing the need of unit piling and traying of non-packaged materials.

Where materials are manufactured or reclaimed in railroad shops and returned to stock for distribution,

standard packaging recommendations should be followed.

In developing recommendations for standard packages, consideration was given to their practicability, both from a purchasing standpoint and the handling of material in the stores department. In several instances manufacturers were consulted as to whether packages recommended would fit into their production methods without causing increased costs. The committee also kept in mind the possibility of recommending packages which would not necessarily increase stocks.

Standard packaging proposals are contained in an attached schedule, with the understanding that the quantities specified need not be considered final, pending probable conferences em-

bracing the several interests concerned. The tentative package quantities would, to a substantial extent, permit redistribution without breaking packages. They are also based on regular re-

PROPOSED PACKAGE STANDARDS

Materials	Package	Quantity
Insulated joint parts, fibre		
Bushings	Cartons	100
Washers	"	100
End posts	"	100
Base pieces	"	10
Head pieces	"	10
Handles, cant hook	Crates	12
Locks, switch	Cartons	12
Keys, switch	"	24
Levels, boards, track	Crates or boxes	24
Bits, flat headed, track	Cartons	6
Chisels, track	Crates or boxes	12
Mauls, spike	"	12
Picks, clay	Crates	12
Picks, tamping	"	12
Plugs, spark	Cartons	10
Arresters, lightning	Cartons	12
Renewals, battery, 500 a.h.	Boxes	16
Renewals, battery, 1000 a.h.	"	8
Bootlegs, signal	Cartons	4
Braces, galv. cross arm	Bundles	20
Clips, universal test	Packages	10
Fuse wire, 3-amp.	Spools	½ lb.
Fuses	Packages	10
Insulators, signal	Cartons	40

Materials	Package	Quantity	Materials	Package	Quantity
Tags, aluminum	"	100	300-lb. tees—Up to 1¼"	"	12
Tags, fibre	"	100	—1½" and up	"	6
Bolts, cross arm, ⅝x12-14-16	Boxes	50	300-lb. nipp'es—Close to 6"	"	12
Bolts, cross arm, ⅝x18-20	"	25	—6" and over	"	6
Bolts, double arming, ⅝x14-16-18-20	"	50	Unions and parts	Cartons	6
Rings, bridle, 1½" opening	Cartons	100	Valves—A.A.R.—Up to ½" inc.	"	6
Screws, lag, galv. fetter drive	"	50	—¾" and up	"	2
Washers, square, A.A.R. std., ⅝"	"	200	Valves—A.A.R.—Parts—Up to ½" inc.	"	12
Staybolt caps, sleeves, nuts	Cartons	100	—¾" and up	"	6
Bands, pipe for superheater units	Boxes	100	Cocks—air—hydrant—steam	"	4
Bolts, superheater header	"	50	Flat riveted keys	"	50
Supports, superheater unit pipe	"	100	Cotters, flat spring	"	100
Washers, superheater unit pipe	"	50	Boiler lagging hooks	"	5 lb.
Washers, superheater unit pipe clamp	"	25	Bearings, steel ball	"	6
Ferrules, copper, 1⅞" to 3⅝" O.D.	Cartons or boxes	100	Gaskets, tank hose	"	10
Ferrules, copper, 4½" to 5⅝" O.D.	" " "	50	Boiler lagging, A.A.R. sizes	"	24
Air Brake Parts:			Carborundum	Cans	5 lb.
Pc. 1735 Emergency valve	Carton	12	Emery	"	5 lb.
1751 Air strainer	"	12			
1754 Check valve case gasket	Carton	25			
1998 Washer	"	6			
2421 Vent valve	"	12			
2425 Handle	"	6			
2427 Triple valve gasket	"	25			
3279 Hose coupling gasket	"	50			
4876 Check valve case gasket	"	50			
4880 ½"x2" hex. head bolt and nut	"	25			
10031 Packing ring	"	25			
16074 Air brake pins	"	100			
18286 Graduating spring	"	25			
68579 Wabco cups, 10"	"	10			
72433 Rubber seat	"	25			
75345 Feed valve gasket	"	10			
75957 Cylinder cap gasket	"	25			
81597 1¼" union gasket	"	10			
81600 ¾" union gasket	"	10			
84311 Angle cock, 1¼"	"	6			
87726 Union gasket	"	50			
95106 Wasp plugs	"	25			
QT-220-V Emergency valve	Carton	12			
EV-613 Washer	"	6			
RV-25 Vent valve	"	12			
RV-27 Handle	"	6			
QT-235 ½"x2" hex. head bolt and nut	"	25			
PT-86 Packing Ring	"	25			
EV-706 Graduating spring	"	25			
EV-979 Feed valve gasket	"	10			
SR-46 ¾" union gasket	"	10			
QT-220-V Union gasket	"	50			
PR-194 Wasp plugs	"	25			
Alemite fittings—⅜ No. 1184	Carton	50			
¼ No. 1401	"	50			
¾ No. 1396	"	50			
Alemite nipples—No. 1488	"	50			
Pop valve base—3½" valve	Carton	1			
Parts for No. 11 MNL inspirators:					
Tube —No. 2204 Forcer	Carton	2			
Bonnet—No. 2257 Alarm valve	"	4			
Nut —No. 3367 Alarm valve coupling	"	6			
Spring—No. 2380 Trigger	"	12			
Stem —No. 2447 Overflow	"	4			
Bonnet—No. 2448	"	2			
Parts for lubricators:					
Valve —No. 33 drain	Carton	6			
Plug —No. 34 Drain valve	"	6			
Gaskets—White asbestos for reflex water glass	"	100			
Gaskets—Graphited for reflex water glass	"	100			
Glass —Water, reflex	"	6			
Gaskets—Rubber No. 25 water gage	"	50			
Rings—Packing No. 1225 ⅝" I.D. x ⅝" O.D. for inspirators	Carton	25			
Rings—Packing, 10/16x1¼" same	"	25			
Gaskets, steam heat hose	Carton	25			
Grommets, style No. 3	"	1 gr.			
Window shade cloth	Roll	60 yd.			
Key for pass. coach	Carton	12			
Sash lock, coach	"	12			
Weatherstrip	Bundle	25			
A.A.R.—Engineers' oilers—long spout	Carton	12			
Torches	"	12			
Cans—Oil—1 gal.	"	12			
—2 gal.	"	6			
—5 gal.	"	3			
Torpedoes	Boxes	10 gr.			
Fuses	"	1 gr.			
300-lb. couplings—Up to 1¼"	Cartons	12			
—1½" and up	"	6			
300-lb. elbows—Up to 1¼"	"	12			
—1½" and up	"	6			
300-lb. reducers—Up to 1¼"	"	12			
—1½" and up	"	6			

quirements, but do not preclude railroads from ordering materials in larger bulk where required for special improvement or construction projects.

The subject should be continued and the committee directed to (1) contact manufacturers to develop standard packaging; (2) develop complete recommendations covering air brake and injector materials; (3) develop recommendations on other commodities and groups of materials, such as electric headlight parts.

The committee consisted of W. A. Clem (general chairman), purchasing agent, Reading; A. G. Follette (assistant general chairman), general material supervisor, Pennsylvania; E. H. Hughes (chairman sub-committee A), general storekeeper, Kansas City Southern; L. F. Duvall (chairman sub-committee B), assistant general storekeeper, Atlantic Coast Line; G. A. Goerner (chairman sub-committee D), general storekeeper, Chicago, Burlington & Quincy; C. H. Murrin (chairman ex-officio), general storekeeper, Louisville & Nashville; and 23 sub-committee members.

Discussion

W. F. Redman (C. & N. W.): Where reference is made to Handles, Cant Hook, Crates, and spark plugs, why depart from multiples of five into the half-dozens and dozens.

Mr. Clem: The manufacturers preferred to pack them that way.

D. H. Reed (Sou.): If we could persuade manufacturers to keep to a decimal basis it would be much easier to calculate and handle our stock. Stock checking would be much easier and simpler.

Mr. Clem: Our original intent was to prepare this whole schedule on the decimal basis, but we did run into difficulty because of the standard practice to break things up into dozens, half dozens, grosses, etc.

Chairman Clifford: Isn't it a fact that some of these things lend themselves to packages other than the decimal?

Mr. Clem: They do, because of the nature of the product.

Chairman Clifford: The committee has given consideration to this phase of that situation: unless we gain some advantage there is no object in going to the standard packages too extensively.

J. T. Goodloe (Sou.): You recommend copper ferrules in cartons of 100 and 50. We have been getting our ferrules in barrels.

Mr. Clem: Some are getting them that way, without extra charge.

C. D. Baldwin (Bang. & Aroos.): Some railroads are small, and if you get the standard packages too large, it puts us at a disadvantage. The standard package should be as small as possible, so that small roads can get the advantage of price. The big roads can double their orders if necessary.

Chairman Clifford: Is there any quantity here that is too large?

Mr. Baldwin: I know that in the past some standard packages made by manufacturers have been so large we couldn't buy them, and we may have to pay 25 per cent extra because we wanted to get a little smaller quantity than the standard package.

The report was received as read.

Fifth Session of Mechanical Division

Address by L. K. Sillcox features meeting—Scheduled reports presented and discussed

THE fifth session of the Mechanical Division was called to order by Chairman Burnett at 9:30 yesterday morning. The principal address at this session was made by L. K. Sillcox, first vice-president, New York Air Brake Company, who discussed the trend

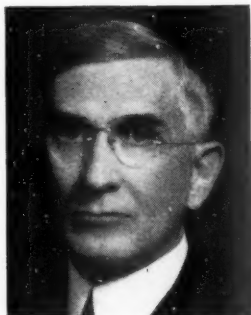
in the design of car equipment and its effect on the volume of traffic. The address was followed by the presentation and discussion of the Arbitration Committee report and reports on Prices for Labor and Materials, Loading Rules, Tank Cars and Lubrication of Cars.

What Next in Car Equipment

Improvement in utilization of the freight car the key to its future development—Lower wheel and axle loads important in high-speed service

By L. K. Sillcox

First Vice-President, New York Air Brake Company



L. K. Sillcox

The railway car, as it may be adapted for service in either the freight or passenger branch of transport, represents no more than a single dependent element in the intricate mechanism which is the railway. It cannot be considered apart from the lading which it must carry, the distances which it must travel, the men who control its movement, the track and terminals over and through which it is dispatched, the motive power provided to give it mobility, its economic influence upon investment and operating costs and, perhaps, most important of all, the needs and preferences of the public which has use

for it. Equipped with flanged wheels, the railway car cannot perform a universal service in itself. Associated in trains with other cars which serve specific purposes, it is not free to rush to destination in unrelated fashion so soon as its burden is stowed away or its seats filled. It must loiter in terminals pending disposition of all associated cars. The railway method of conducting transport requires that all cars in a given service must harmonize completely in many respects—design standards must be followed and these restrict the initiative which may be displayed in originating a car form to meet a new and insistent service demand.

We are confronted with certain outstanding factors which should influence our realistic approach to any railway problem, whether it deals with labor, with way-bills, with freight cars, or with any other element in the transportation machine. The traffic trend is definitely unfavorable to the railways. Recognition of this truth should engage and seriously dominate our every thought. We are here to think of freight and passenger cars, not specifically as certain forms of containers, mounted upon rolled-steel or chilled-iron wheels, with spring-bearing trucks offering certain characteristics within known limits, carrying draft gears, brake equipment and specialties which must conform with accepted standards, all weighing more or less than a certain median figure, depending upon the peculiar preferences of the officers who choose them, and the cost and operating value of their construction, but to think of railway cars as vital tools of a far reaching industry.

Extensive research activities have been promulgated, looking

toward the improvement of the freight car, while the passenger-train car has received no less attention. It is natural that the freight car, more universally interchangeable, should be accorded more searching investigation through the joint participation of all railways. The passenger-train car is more the development of the railways individually, although the experiences of one administration are reflected in the equipment design of another and throughout, the practices followed by the Pullman Co. are widely persuasive. But if we view the freight car, for example, as a distinct element in railway operation, wholly dependent upon a thousand or more associated facilities, if it is to be fully utilized, we may wonder just why we are concerned with trivial appointments when there may be much of the railway plant which has undergone little change or improvement over a period of many years. Why must we continue to construct our new cars so that they will harmonize in service with facilities, some of which may be seriously out-moded?

Many refinements of undoubted merit are already available but they obtain recognition too slowly as operative parts of the cars themselves. The mechanical engineer is not at fault. It is his devotion to his task and his faithful protection of the interests of his company, in fact, which retard rapid developments along these lines. His calculations must show that the additional investment will be returned and that a profit will accrue. When the fitness, based upon operating results and net cost, of any alternative construction or newly developed specialty is to be assessed, the engineer first seeks out the basic factor, utilization, as the one upon which his decision must be finally predicated. It may be annual car-miles, net ton-miles per car per year, times loaded per year, or gross-ton-miles per car per year. In whatever form it may be presented, it still reveals its predominance in governing policy relating to the first cost of equipment. We boast the progressive increase in freight-train speed while suffering annual freight-car mileage figures of from five to twenty-five thousand. More service is secured from passenger train cars—otherwise they could not be permitted to cost more than freight cars and if they did not, we can safely assume that the railways would find little use for them since they would not be acceptable to the public.

Why Is Traffic Leaving the Rails?

If the freight car of the future allows no broader freedom of design than that of the past, I doubt that anyone would consider

this branch of the railway service truly progressive. We have considered utilization which, if improved, will probably accomplish more than all else in removing the barriers to basic improvement. One must turn to traffic statistics and evaluate their tendencies to determine what influences the actual design of freight and passenger cars, as the facilities in which the public will display the most intimate interest, may bear upon the ability of railways to recoup their traffic losses. Why have the railway competitors been able to inject themselves so successfully into the national transport system? What do they offer that the railway cannot duplicate or improve upon? Why is traffic forsaking the rails and to what extent can the car equipment of railways, properly adapted and co-ordinated, reverse this trend?

Railway cars should not be the commission of the mechanical departments alone, nor yet that of the mechanical and traffic departments jointly. The traffic department should do more than to advise the freight-car capacities which its survey shows would be most acceptable to shippers and to judge whether anthracite will move in open-top or box cars. Its interest should extend far beyond the public reaction to a few minor changes in passenger car appointments—most frequently compromises in themselves. There may be revolutionary changes in all car types, unexplored and consequently not now considered. There may be a need for new car types to improve the railway status in competitive transport. The operating department holds a stake in this traffic lottery and owes its cooperation. Who can state with confidence that our cars are designed to serve most efficiently, supported by truly coordinated transfer and maintenance facilities? There are current practices to be discouraged as well as encouraged. There is traffic to be avoided and traffic to be sought. There is a service boundary within which the railways should cease their struggle with the highway and intelligently surrender tonnage to a more competent agency on a reciprocal basis. Herein is the true field for railway participation in highway enterprises.

Travelers and shippers do not engage highway facilities without a seemingly good reason for doing so. Rates and relative restrictive regulation will account for at least a part of the railway traffic lost but it cannot explain all. Travelers prefer the private automobile because of its convenience, flexibility, and economy when used to its capacity. It may be a necessity at destination. Branch-line accommodations may be highly undesirable as regards appointments, speed, and frequency of service. The passenger insists upon the availability of his automobile. Perhaps the railways require a passenger-train car, it may be a double-deck affair with skeleton framing, which will load quickly with automobiles from the station platform and which will transport them, together with the passengers' luggage and personal effects, with such economy that a competitive rate may be quoted. It may be impracticable but I doubt that anyone could label it so with authority based on any actual study that has been made.

Paramount is the fact that finer appointments and faster schedules attract traffic principally from competing railways and thereby fail to improve the industry as one might suspect from a mere review of traffic figures pertaining to new trains. It is quite a different matter when the automobile traveler rides the rails. While railways may never rival air speed over long distances, having done their utmost in matters of safe speed, they may offer so much in freedom, comfort, and convenience that travel by air will not prove the formidable competitor that the automobile has become.

Railway L.C.L. Service Poor

There seems less opportunity for revolutionary research in any attempt toward improving railway passenger service and equipment than in freight practices although opportunities for the study of new passenger methods are still attractive. The requirements of all passengers are very much the same—they vary only in degree and the abilities of the individuals to purchase the potential accommodations they would like to enjoy. On the other hand, the diverse services demanded by a great many commodities result in affording a fertile field for ceaseless study to the end that railway transport may be more attractive than another type. All freight traffic may move promptly. The demand may not always be insistent but there can be no virtue

in avoidable delays as there may be in short, overnight passenger movement. Costly commodities generally merit preferred attention and unless highway service is definitely inferior, the traffic will abandon the railway to take advantage of a lower rate.

When prompt delivery of L.C.L. merchandise is essential, it is not unusual to find shippers and consignees agreed that highway freight service is the more reliable insofar as the time element is concerned. This is oftentimes true for distances of 500 miles or more. Railways know this to be so. They, themselves, patronize highway freight for the same reason. Irrespective of their shortcomings, lack of responsibility and dependability in some instances, the accomplishments of the truckman must be recognized and applauded. Short distance L.C.L. traffic must be regarded as unprofitable for railways as it is usually handled. It becomes more so as the number of intervening classification centers increases. Repeated handling of individual shipments consumes valuable time as well as expense.

Unless a better method of handling small shipments can be devised, the railways cannot truly object to the inroads of highway competition—rather, they should first encourage and then adopt it as a more practicable means of conducting an indispensable service. It may be possible for railways to still further improve their L.C.L. methods. In certain territories the container has proved successful—in others, overnight truck ferry service appears to offer advantages, both to the truckman and to the railway. Either system is necessarily limited in its scope under existing plans.

The traffic departments may be adhering more closely, than modern conditions justify, to a basic system of rate making which foundered with monopoly. Competing railways may be attempting to retain a few parcels in an unremunerative service even though, to do so, they would interfere with a bold and meritorious experiment which may prove invaluable to all railways as a closely knit, unified, and cooperative industry. Store-door service by railways was similarly contested. The highway operator knows no method for the determination of tariffs other than counting his costs and estimating the revenue load upon which he can reliably depend. He carries no sand or gravel in his van nor does he serve in the long haul of grain from the mid-west wheat fields. He scans the railway classification schedules and selects the commodities upon which he can underbid the railway and show a profit. The railways will be forced, more and more, to compete on the same basis. A partial unbalance of the rate base, constructed upon the principle of "what the traffic will bear" cannot be offered as a just reason for opposing any railway service which is effective in competition with the highway.

There may be scarcely a car type which cannot be studied and revised in the light of traffic necessities. Sometimes such changes must await—sometimes they may precede—alterations in attendant facilities. At all odds, desirable modifications should not be ignored for the reason that their proper use requires correlated facilities outside the authority of the mechanical departments.

Low Car Utilization Demands Low Cost

Is it not impressive that the railways furnish their most costly car type for the handling of automobiles whereas the highway automobile forwarding trailer is of the least costly framework conceivable? Railway automobile cars are in constant demand. Being of superior type, they are desirable for many commodities. One empty movement per loaded trip is the rule, costly in itself and progressively more so as the value of the car continues to increase.

An all-purpose freight car, loading through roof, sides or ends, with discharge hoppers in the floor for bulk commodities, has been recommended and various types have been investigated. Each analysis has shown the design to be impractical. Such a car could be built without difficulty. Its cost would, however, be prohibitive and it would be less universally adaptable than is generally conceded by its proponents. A single, high standard of maintenance would be required if it were to be acceptable to all shippers and it is difficult to see how contamination would be avoided. In theory and principle, the all-purpose car is faultless. It could receive any available lading at whatever point it might be unloaded. Empty car mileage would decrease

and car utilization would increase with less units required. A high unit cost would be justified under these conditions.

In practice it has no real place. Every railway experience seems to point toward the necessity for increased specialization in car type. There is a minimum ratio of empty to total car mileage which apparently cannot be improved. The distribution of traffic, both geographically and seasonally, will prevent the ideal balance which is desirable. Utilization then primarily relates to keeping the car in motion. Its restricted use, in so far as various commodities are concerned, demands that its cost be the least, consistent with reliability, moderate maintenance expense, and economical operation over long periods of time.

The railway car displays one outstanding characteristic. It is symbolic of permanence and its original qualities can be perpetuated indefinitely without unreasonable maintenance expense. It shares this quality with water-borne transport units and differs radically from carriers by highway and air in its basic economics because of the same factor. Its permanence results from unusual structural strength and attendant vehicle weight—strength to span, under load, the length between trucks without undue deflection. Weight in passenger-train cars has meant safety and superior riding qualities. Weight in freight cars has been a measure of their ability to receive lading repeatedly without maintenance attention.

The Low-Alloy Steels

We cannot undertake to define the materials of which cars should or will be constructed. Open-hearth mild steel has proved its merits as well as its limitations. It is realized that substitute low-alloy steels possess the properties of greater strength that are claimed for them and they have displayed superior resistance to corrosion. These are valuable qualities, available at a price—and the higher the initial car cost, the more thoroughly these features may be exploited. Were it not essential that cost should govern, truly remarkable revelations in durability, net-to-gross weight ratio, and relief from maintenance expense might be shown.

Various groups have undertaken to pronounce the operating conditions under which it may be profitable to abandon the use of open-hearth steel to take advantage of some of these benefits. Many procedures are outlined and each requires the accumulation of a considerable amount of data by the administration contemplating new car construction. In lieu thereof, indications obtained by the use of mass statistics are sometimes suggested, but these are valueless for obvious reasons. It is doubtful that the specific operation can be found which conforms with the national freight car average to which it contributes only an influence. Railway mechanical officers question the wisdom of constructing these cars, still experimental, in large numbers. There are compromises of known value which will be more readily adopted. The exact service performance of the newer materials is still imperfectly known. Factors in the economic equation are in question. Utilization figures are most disturbing.

The situation respecting passenger train cars is more favorable toward marked change. Operating factors are not only more readily available but they are invariably more reassuring, permitting greater liberty in the definition of design and cost. Passenger train cars may operate altogether on home lines, whereby all benefits of light weight accrue to the railway which claims ownership. Light weight assists greatly in the improvement of schedules when motive power is of existing type with fixed capacity and when it is undesirable to reduce the number of cars or their dimensions. Thus, passenger services will comprise the proving ground for new materials of car construction. Extreme weight reduction is permissible when the column strength need not be that relatively required to receive the internal reactions attendant upon the assembling of one hundred or more coupled cars. Car-body deflection figures which would be intolerable in freight equipment may not be objectionable in passenger-train cars which are always lightly loaded and are not subject to end loading of high intensity, but there is no car design for which the suitability can be judged by reference to stress figures alone. Deflection will invariably govern when a proposed design would take full advantage of the physical properties of high strength alloys.

Slowly the complete knowledge of new materials will be ac-

quired to the point that they will not be regarded with distrust when proposed to withstand the rigors of freight service. An important objection will be overcome and the uncertainty of maintenance expense of cars so constructed will be removed. The subsequent rate of adoption of the newer materials will then depend wholly upon railway achievements in car utilization and the ultimate price of lightweight or high-strength alloys furnished in large quantities.

Impacts and the Draft Gear

If weight reduction were to be accomplished by relieving, in some measure, the stresses to which freight cars are subjected in service, and cars were thus built to withstand less trying demands, a far-reaching benefit would accrue. There is reason to believe that railways may look forward to economies in this direction, particularly as the result of more efficient, high-capacity draft gears, subjected to proper periodic inspection and maintained in compliance with mandatory A.A.R. rules which assure the car full draft gear protection at all times, coupled with better performance derived from modern types of air brakes.

The violent impacts, due to external and internal collision effects in train movement, constitute a branch of our subject which can here receive only passing attention. The velocity of impact may be so great that the time for the development of resilience by the distribution of internal stress is very short. The velocity of transmission of stress in steel is about 17,000 feet per second, and a contact velocity of 1,000 feet per second is probably very near the limit which may be suffered without local damage of some kind. Buffing stresses are those of direct compression and formulas of penetration, based on shearing stress, are of only slight value under such extreme conditions.

The numerous efforts to compute the pressure caused by impact of colliding cars form a series of paradoxes which originate in defective mechanical conceptions. The frequent assumption that the pressure is equal to the momentum is one of these which has, of course, no reasonable basis, except in the particular case of a train being brought to rest by a uniform resisting force in a specified unit of time. The assumption that the pressure varies with the work done by the decelerating medium has no reasonable basis at all. The correct principle recognizes that the mean value of the pressure, multiplied by the distance through which it acts, is equal to the total work done in the movement, but this gives no idea of the variation of the pressure nor its maximum intensity.

These unnecessary paradoxes and misinterpretations can be dispelled only by a clear conception and correct application of the fundamental laws of mechanics. The definitions of force and stress, work and energy, must be clearly understood and the law of conservation of energy must be made the basis of every step of the reasoning. Too great attention cannot be given the elucidation of these fundamental conceptions in view of the lack of precision which is so frequently apparent. There are no laws of persistence of force and of continuity of motion as sometimes referred to, but the phenomena of both force and motion are merely consequences of the inviolate laws of energy. In any particular case, either force or apparent motion may vanish as the energy becomes potential or assumes the form of heat.

An examination of removed draft-gear assemblies and a measurement of the development in service of free slack in the gears and their attachments, lend authority to the statement that, at the present time, relatively few gears perform the function which is expected of them. Furthermore, it was not until the back stop and bolster center filler were combined in one massive integral steel casting that undue maintenance attention of the draft lugs was relieved. Cars regularly receive and absorb tremendous sill reactions and they resist these forces without damage. How much weight could be removed from the car, were the sill reactions never to exceed the maximum delivered by a fully operative draft gear before closure, is a question which should interest all maintenance men and car designers. Draft-gear characteristics, as disclosed by their force-closure curves, are excellent guardians of the car structure. The certified gears are unquestionably vastly superior to many which have been allowed heretofore. There is little value, however, in the installation of a draft gear which, while capable

of excellent laboratory demonstration, may soon lose its capacity to protect the car, through questionable reliability in the action of its friction elements or through failure to accord proper maintenance attention. Railway mechanical officers are interested in much more than the maximum sill reaction within the travel of the gear and they should not be satisfied with a proved ample area beneath the demonstrated force-closure curve. The total amount of energy which will be dissipated, under service conditions and over a period of months, is of real interest. It will then be possible to define inspection periods and enforce removal for a truly indicative test and possible replacement if well selected minimum standards are not met. It is difficult to estimate what such a program would represent, in terms of possible reduction of weight and cost in car and coupler, elimination of many road delays, and car-repair expense. The draft gear is so vital an element in the successful operation of railway service, that it merits the study and improvement which are required in air-brake equipment and it should be subject to equally searching inspection and standard repair. We well know the consequences were the air brake as lightly considered and loosely specified.

The Wheel and Axle Problem

Shelling of wrought steel wheel treads and thermal checking in flanges and rims are defects which have probably been responsible for as much of the wheel replacement cost of our railways, considering both main and branch lines, as condemning limits of wear. Modern tendencies in wheel loading and speeds, as well as the fact that the branchline passenger business represents a diminishing proportion of the whole, are increasing the prevalence of such defects despite the wonderful advances in knowledge of wheel compositions and manufacturing processes which the past few years have witnessed. There is no uncertainty with respect to the causes of these defaults. Shelling results from tread pressures which exceed the shearing resistance of rim metal. Separation occurs along definite planes and the surface metal falls away. Thermal cracking is the result of high, local temperatures. Flanged brake shoes, despite their apparent efficiency, are being rapidly abandoned since railway mechanical officers have generally come to realize the price which they have paid for that margin of efficiency plus the simplest shoe-aligning method.

Speed increases the cost of wheel replacements due to shelling since it increases the dynamic loading at the tread. It aggravates the tendency of wheels to develop thermal cracks since heavier brake applications are required and they are longer sustained. High static wheel loading is associated with shelling for obvious reasons and with thermal cracking because of the effect of static weight upon brake-shoe pressure when an attempt toward uniformity in braking dictates a uniform braking ratio on all trucks. That uniform braking must result from this practice is a fallacy too prevalent in the minds of railway mechanical officers, but where equipment must be used interchangeably, it is now accepted as the only reasonable compromise. Despite a quite general appreciation of these relationships, the designers of many completely modern units for high-speed rail service have disregarded the conditions essential to satisfactory wheel performance. While contemplating higher speeds, they have sacrificed wheel performance to secure some slight advantage in total weight and their troubles have been legion. To halve car weight and then articulate the ends, sometimes actually increasing the wheel load by reducing the number of wheels, and furthermore limiting their size to 33 in. spells trouble even though it were not proposed, at the same time, to increase normal operating speeds 25 to 50 per cent. The error is already manifest and future cars will increase the number of wheels per unit of weight and will employ wheels of larger diameter where they can be accommodated in the design.

To determine the influence of wheel loading upon thermal cracking of wrought-steel wheels in passenger service, the wheel record of 25 passenger cars equipped with six-wheel trucks was checked over a period of one year. But one thermal cracked wheel was removed. A check of 25 other cars, identical except that four-wheel trucks had been installed, disclosed 191 wheels removed over the same period of time. Car weights were 148,000 and 133,000 lb., respectively. Mileage figures are not known

nor is it probable that all the cars on six-wheel trucks were operated continuously in fast main-line service throughout the period as were the four-wheel truck cars. Yet the comparison is so obviously favorable to the lighter loading, there should be no hesitancy in recommending the use of the six-wheel truck although it adds 15,000 lb. to car weight and is more costly.

Recurrent axle failures under high-speed trains, while not occurring with such regularity as to be truly alarming, must direct attention to the increase of dynamic loading with speed and its effect upon every part of the car structure—especially those parts which are not spring borne. It is estimated that the allowable stress in axle design should be reduced 20 per cent for equipment operated at 100 miles per hour as compared with the permissible stress limit for 60 miles per hour, based upon the records of axle failures accumulated over a period of many years. Some such graduation of wheel loading with speed is no less essential but the rate of reduction will doubtless be at an even greater rate. Such indices also assume round and balanced wheels. A 1-in. flat spot on a 36-in. wheel, rotating at the rate of 15.5 revolutions per second (equivalent to a 100 mile per hour road speed) produces a dynamic effect, measured in terms of vertical acceleration, approximately twice that of a 2½-in. flat spot on the same diameter wheel at 60 miles per hour. The 1-in. flat spot maximum in passenger service is specified in P. C. Interchange Rule 8. Insufficient attention is given the rotundity, concentricity, and balance of car wheels, although the effect of any one of these conditions, while less distinct as judged by a passenger within the car, may be of greater moment in its effect upon wheels, axles, and the entire car structure. Car springs often conceal many harmful wheel and rail reactions.

Rotative speeds of wheels under railway rolling stock are relatively low as judged by automotive engine or turbine standards but the weights involved are, as a rule, much greater. Balancing of railway wheel and axle assemblies has never been practiced by our railways except in the case of locomotive driving wheels where the condition would otherwise be intolerable due to suspended weights. In England and on the Continent, the actual dynamic balancing of locomotive driving and passenger-car wheels has long been practiced and is considered essential to the most favorable riding qualities and of true economic advantage.

In this country, balancing methods and devices have developed commercially to a higher degree but research in dynamic balancing has been conducted independently of any railway interest. First developed for small parts and gradually extended in capacity to receive large motor armatures, these balancing machines have as yet found no place in railway shops. Progressively increasing speed will emphasize the necessity for maintaining closer tolerances than those allowed at present. High-speed trains should, no doubt, operate on wheel and axle assemblies which are entirely free from internal dynamic disturbances. This will combine with associated refinements in truck design and control of truck-car body reactions to improve materially the riding and tracking characteristics of the equipment.

Make Lasting Repairs

Permanence of car repairs must accompany an enlightened program of maintenance. The line or spot system is daily gaining favor and some excellently arranged car shops are to be found scattered throughout the land, well equipped and economically operated. When released from periodic inspection and repair, as governed by the allowed air-brake cleaning interval, cars should, barring accident, operate without attention other than routine inspection and adjustment in receiving and dispatching yards. Fifteen months are allowed with K type brake equipment. The AB brake is designed to operate 36 months between consecutive removals for cleaning. The freight car which will operate over this period without rip-track switching, will justify most careful repair and removal of all parts which bear evidence of their inability to serve without attention until the next scheduled inspection. Replacement of these parts, with sacrifice of some wear, will ultimately prove to be the most economical. Three years of trouble free service is not an unreasonable requirement.

Many passenger train cars operate on the basis of no service

interruptions between twelve or fifteen months cleaning periods, covering 125,000 to 175,000 miles in this time in main line service. This is more than twice the mileage that a freight car will operate in three years of service which may be considered truly intensive. The freight car is subjected to more rigorous service, it is true, but this is due, in no small part, to the failure of its draft mechanism to function as intended, due either to obsolete or inferior designs being continued in service, or to failure to afford proper maintenance.

The Future Freight and Passenger Cars

Pending revolutionary advances in freight handling and car utilization practices, the freight car of the future will quite surely remain the freight car of the present in type, general principles of design, and appearance. Its trucks may respond to changes which will permit its operation at much higher speeds with complete safety. Spring suspension systems will have to afford freedom from resonance effects. The real change will be one which is not greatly in evidence and it will be represented by greatly improved standards of maintenance. This must be not only recommended, but also truly enforced by interchange agreements and the cost will be many times repaid. Not until freight car utilization figures are doubled and trebled by joint study of all departments of railways, re-enforced by systems of terminal handling and classification speeds now accorded only to preference movements, will the freight car, as we know it, justify the expenditures required to modify its form and fixtures in any major respect.

The passenger train car is destined to more rapid change. The public is vested with a very live interest in its appointments and the failure of railways to recognize these demands will simplify the competitive problem of highway and air service. Interiors must be studied with new zest. Many so-called improvements to date will soon be regarded as makeshift camouflage with no basic attraction.

It is strange, indeed, that air liners and sleeper buses with their space limitations enforced by the very nature of their operations, advertise sleeping berths longer than those offered by railways.

The railways can well feature safety in carefully chosen terms for the public is disposed to treat this paramount requisite too casually. Safety advertising will be abetted by more sympathetic attention as air and highway fatalities touch more intimately an increasing number of people. It seems to require the loss of relatives, associates, or many public figures, through disasters such as that of the Hindenburg, to make the individual mind conscious of the personal hazards encountered. Airship travel has suffered reverses in progress which will require a decade to dispel. The records of the Shenandoah and Macon destroyed public confidence in American-built dirigibles that effectively halted further exploitation. It will be difficult to convince the American people that any lighter than air craft, irrespective of the exact cause of the latest disaster, can be as safe as the 1936 record indicated.

Changes Must Be Tested for Safety

Safety cannot be the singular attraction of any mode of travel. Styling and appointments are secondary only to riding qualities as measures of appeal to passengers. The characteristics of new materials lend themselves to design changes which, while not necessarily important engineering advances in themselves, provide that sense of novelty and progress which stimulates sympathy toward whatever administration furnishes them. There should be as much distinction in patronizing fine railway accommodations as in making a journey by air. The traveler should derive as much in gratification of personal vanity in announcing his recent arrival by train as he seems to enjoy in stating that he just "flew in." The most costly service will always appeal to a few whose judgment of values is based upon price and who have no fine discernment of transport progress and excellence, irrespective of the specific type. This type of passenger does not contribute most to net traffic volume and it is not his patronage which the railways should solicit to the extent that the coach passenger is not properly served. He may continue to travel by air anyway.

Probably little more attention will be required in day-coach

design than has been experimentally accorded it by some railways, provided the conventional day coach is to be perpetuated as the basic railway passenger vehicle. It unquestionably does serve the essential purpose of affording the lowest net cost in mass passenger transport. Riding qualities must be and are being improved. Recent research in this most important field, conducted by one of our foremost railway systems, using various current designs of passenger cars, disclosed vast improvements already attained, but still defects in ideal comfort were evidenced by the best.

Advance in Passenger Car Limited to Trucks

"What next in car equipment," is contingent upon progress in fields of operation quite remote from the immediate responsibilities of the equipment engineer. If freight-car handling methods can be revised, with particular regard to terminal operation and delays, not only will the service to shippers be improved as a result of accelerated deliveries, but opportunity will be given the designer to increase the efficiency of the car and this, in turn, will affect both the service and the economics of the business. Unlimited possibilities lie ahead for freight-car improvement if the service will justify a higher first cost. Advance in the passenger car will undoubtedly necessarily be limited to truck changes to assist in overcoming the wheel and axle problem, while adding to the riding qualities, and to rearrangement of interiors to satisfy an impatient public. Throughout all this process, we must be awake to the service features which other forms of transport have exploited most successfully. The motor rail bus for branch-line and main-line local service has not developed in popularity as early experiences indicated it might but, with further traffic increases, interest in this very capable type of transport, employed to afford an attractive service, should be revived. British railways have converted the rail bus for fast and economical transport of l.c.l. merchandise. We may have need for it here.

Whatever may be the specific direction in which design trends progress, we may be assured that the railway cars in all services will reflect, not only the ideas and preferences of their designers insofar as limitations in allowable cost permit, but the extent to which related departments appreciate the problems with which the engineer is confronted and co-operate with him.

Discussion

L. Richardson (B. & M.): Transacting a wholesale and a retail business by the same procedure is not economical. No activity attempting this has ever succeeded over an extended period of time. Units, sales methods, credits, etc., are widely different.

L.c.l. freight is the retail business in railroading. Yet for years, rails have handled it much the same as c.l. freight. Competition that has grown with the development of the truck has disclosed this weakness with a resultant loss of traffic.

A study of the costs of a proposed household movement presents striking facts. The cost of packing, for a regulation freight movement, was more than twice the freight bill for 200 miles. Operating costs of modern trucks have been so reduced that 527 miles of highway operation could be done for the packing cost. To move by freight, economically, the rail would be under a 527-mile handicap at the start, to say nothing of distance. Yet, once under way, rail costs are a fraction of highway costs.

Mr. Sillcox clearly analyzes the problem as belonging to three departments, not one. The operating and traffic departments as well as the mechanical department must help in solving the problem. The operating department's share is providing service that does not require appreciably more packing than does the truck. The traffic department will determine the shipper's size and weight requirements. With these basic specifications, the mechanical department can readily work out the details.

With such equipment available, the traffic department will have the opportunity of regaining much lost traffic. Increased traffic volume, especially securing new traffic, is one of the surest ways of improving the general rail situation.

P. W. Kiefer (N. Y. C.): The fundamentals with respect to

the "all-purpose" freight car as proposed sometime ago are ably set forth by Mr. Sillcox, and I want to say that although on the system with which I am connected all departments such as traffic, transportation, operating and mechanical co-operate very closely on matters pertaining to equipment, our experience during recent years checks with Mr. Sillcox's statement that "In practice it has no real place. Every railway experience seems to point toward the necessity for increased specialization in car type." In other words, we have been required to concentrate on providing, within reasonable limitations, the numerous specially equipped units which seem to be necessary to meet service demands.

On this subject I quote as follows from the annual report of the Committee on Car Construction for 1932: "It is conceivable that further reduction in weight might be accomplished in the future through development of smaller units designed for either freight or passenger service, some of which might take the form of sectional container cars."

The all-purpose car idea came along later but in addition to the above possible advantages, it would seem to me that the sectional container car in some form might better perform the service. Containers or demountable truck bodies could be arranged to handle shipments requiring refrigeration of varying degrees together with merchandise loadings, thus increasing the effective total load and also the flexibility of operation, perhaps with fewer cars. In fact, this is being done to a limited extent.

In a discussion of design features Mr. Sillcox states that: "If weight reduction were to be accomplished by relieving, in some measure, the stresses to which freight cars are subjected in service, and cars were thus built to withstand less trying demands, a far-reaching benefit would accrue." Among equipment designers this fact has long been realized and as an illustration, I again quote from the report of the Committee on Car Construction for 1932 when the A.A.R. steel-sheathed box car was first presented and adopted the same year as standard practice: "The anticipated life and durability of a freight car depends not so much upon the use to which it is put as upon the abuse to which it is subjected. If it were not necessary to design cars to withstand severe service punishment, much lighter equipment could be built and successfully operated. As time goes on, it is believed that improvements may be expected in cushioning devices, more resilient and flexible truck combinations, standards of running-gear maintenance, yard operations, train handling and braking practices and through cooperation of all concerned, including the shippers, traffic and operating-department officers and maintenance organizations, the designer may be placed in position to go much further than is now considered practicable in reducing equipment weights."

Mr. Sillcox also refers to economies resulting from more efficient, high-capacity draft gears coupled with better performance derived from modern types of air brakes. He mentions also the violent impacts due to external and internal collision effects in train movements. I believe that further improvements in the draft gear, which I would much rather refer to as the cushioning equipment, will of necessity force themselves upon us as time goes on. At present, what is regarded as "high capacity" in some cases may be definitely detrimental rather than advantageous because as the capacity is increased, the car underframe, superstructure, trucks, truck springs and the road bed must come to our assistance to a correspondingly greater extent. This, in turn, demands refinements in design and construction and perhaps some weight reduction withal, as accomplished in the A.A.R. standard cars thus far produced and to a still further extent in the later alloy-steel designs based thereon, but large weight reductions hardly can be expected under such circumstances.

Furthermore, when speaking of dynamics resulting from "internal collision effects in train movement" we must not overlook one of the principal sources of such destructive action, which is free slack in the draft gear and retaining pockets. When slack is taken and the direction of action is reversed, the resulting uncontrolled movement sets up damaging dynamic effects. This also applies to slack run-in during train operations.

In passenger service the problem is of somewhat different character because here the matter of passenger comfort is of special importance in order to improve our operations and to dispel the idea that a ride on a passenger train means disturbance of rest.

Some definite progress in this direction already has been made. For example, I am advised that the tight-lock coupler for pas-

senger cars is to be presented tomorrow by the Committee on Couplers and Draft Gears, and in addition, passenger-car connection installations, that is, cushioning devices, coupler and attachments now are in service with which dynamic shocks cannot be set up between the cars of non-articulated trains regardless of the manner in which the locomotive and brakes are operated. This pertains to dynamic shocks only and does not mean that proper braking practices can or should be disregarded.

Mr. Sillcox also refers to inoperative draft gears preserving insufficient cushioning capacity which tend tremendously to accentuate the mechanical destruction of the car structure and result in injury to lading. I interpret this and other related discussion in his paper to mean that from the practical operating and maintenance standpoints it is one thing to start out with a new draft gear having reasonably good characteristics but quite another to contend with the effects of rather rapidly accumulated slack due to friction and wear. At least, this is what I believe. Expressed in another way, reasonable preservation of good characteristics is much more important than performance obtained when a draft gear and its connections are new.

Mr. Sillcox also discussed reductions in wheel loads and braking pressures on passenger-car wheels. It must be remembered that the modern passenger car contains a tremendous amount of necessary equipment, all of which means weight, such as brakes, foundation and pneumatic, air conditioning, heating and lighting equipment, not to mention interior fittings and furnishings for the comfort and well being of passengers and that it is an extremely serious and difficult problem for the designer at the same time to control weight so as to permit improvement in schedules without the heavy expense for new and more powerful motive power, regardless of type, which otherwise might not be required. Therefore, from the practical standpoint of providing equipment for a railroad, it is difficult to draw the economic line between such items as the four-wheel and six-wheel truck, especially where the additional weight per car, as stated by the author, may be as much as 15,000 lb.

With respect to axles, I think the problem is less difficult because through improved materials, manufacturing processes and properly adjusted proportions, the stresses insofar as they may be calculated, are controllable with either the four-wheel or six-wheel truck so long as a reasonable load margin under full rated journal capacity is maintained.

Furthermore, means now are available for testing to destruction, under fatigue punishment, full size mounted axles for definite comparative check of various axle designs and materials and an A.A.R. program for such tests is now being formulated.

C. T. Ripley (A. T. & S. F.): Most of us believe that we are in a period which is different than anything we have ever been through before. Changes are coming more rapidly. New materials and new methods have been developed at a rate which we have never seen before, and we must make use of these and take advantage of them. However, the engineering staffs may be induced by competitive conditions to become too impulsive in going ahead with the new developments of both passenger and freight car types.

It is questionable whether it would not be better for a little more co-operation to be exercised in this development between the railroads, instead of excessive competition. Competition is a good thing in many lines, but we all have to work together against the common competitor, that is, other methods of transportation. Possibly we can save a good deal of money for our railroads if we would work all together more and take advantage of the valuable advice of various manufacturers.

One of the most important points in Mr. Sillcox's paper is the stressing of the importance of help and co-operation from other departments, besides the mechanical department, in these developments. This is undoubtedly true, and I think all of you who have had any experience in trying to get up new designs have felt the lack of this help. The officers of both the traffic and the operating departments should give us the benefit of their experience as to the needs of the service, instead of merely criticizing the units after they have been built. That is always easy to do. What we want is their criticism before they are built.

The A.A.R. with its present powerful organization involving all of the departments ought to serve to co-ordinate this work. And here again I think we must recognize the need of everyone working together to develop the best, and not waste money for the railroads.

The paper includes an exhaustive discussion of draft-gear

performance. I feel that the majority of the criticism here is really involved with the older types of gears. I do not think that the newer types of certified gears are going to wear out rapidly in service. Part of the tests of the new gears involve destruction through wrong application of loading. The more important point now is the attachments, that is, the avoiding of the development of slack in the attachments. But unfortunately no mention is made here of the free slack in the coupler. I can't see why an inch of free slack, which is normal in new couplers, is any less undesirable than an inch of free slack developed in the draft gear or in the attachments. The action is just the same. We have to have slack in a train, but we should control it in some way through the gear and through the coupler also.

Mr. Sillcox makes a statement in regard to defective flat wheels. The Wheel Committee recognizes this is an important matter, and is planning to make some experiments to find out just what the effect is. Unfortunately there are not enough tests to demonstrate just how big a flat spot should be permitted, particularly in high-speed service. I think the statement made in regards to a flat wheel under a hopper car is rather strong, but inasmuch as no one has made measurements, it is rather difficult to criticize it.

The problem of shelling and thermal checking is an old one. Your Wheel Committee reports have been full of references to it, but unfortunately most of the railroads have never taken it quite as seriously as they might have. Now that you are getting into this high-speed service the problem has become more noticeable, and I believe it is going to get the attention which it deserves. It is possibly true, as the author states, that, in this high-speed service, the wheels' shelling and thermal checking is of no greater importance than removal from condemning limits of wear. That was not true in the past with the slower speed.

The flange brake shoes referred to have been condemned for many years in the Wheel Committee reports, and yet we have seen them applied in rather modern designs without any thought of what they will do in thermal checking the flange of the wheel.

High static wheel loading is undoubtedly directly associated with shelling. That has been felt for a long time, but it is accentuated again by higher speeds. Just what the maximum static wheel loading of the high-speed cars can be is open for argument. I feel personally from what little I have seen of the problem that we may, with present wheel development, be

limited to high loadings of not over 15,000 lb. That sounds rather low, but these speed factors seem to be so important that we may be tied down to that under present development conditions.

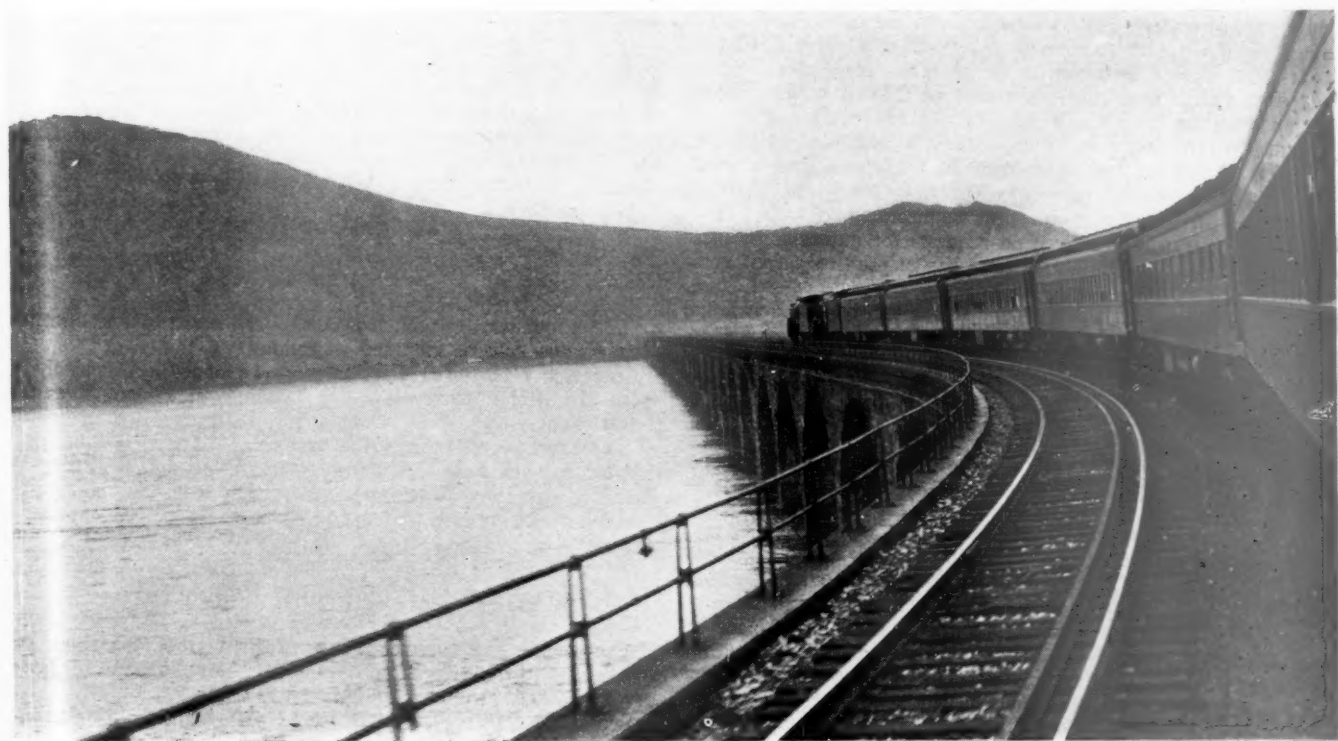
There are three factors that are involved in the wheel service: First, the design of the equipment, particularly as regards weights, the springing, truck construction, etc.; second, the brakes and the handling of the brakes; and, third, the wheel itself.

There is undoubtedly need for further research on wheels for cars in high-speed service. What I would like to see personally is some type of machine developed whereby you could actually develop these defects in the laboratory. It is rather a slow process to put new kinds of wheels into service and wait for defects to develop. You have so many variable conditions that it is difficult to analyze your results.

In the matter of studying rail defects, laboratory equipment has been developed which will help the manufacturers in trying out new methods of manufacture. I am in hopes the day will come when that same thing can be done with wheels. If we can develop shell-outs and thermal cracks in the laboratory we can start making different kinds of steel, different kinds of treatment of wheels, and possibly find a way to develop a wheel which will stand greater loadings and greater heat than the present wheel. It is rather simple to develop a wheel which will not thermal check, and a wheel can be developed which is much more resistant to shelling, but unfortunately, up to the present time when we get a wheel that is resistant to shelling, it is less resistant to thermal checking. There are two extremes, and we have to strike a medium between these two. Research and machine tests, may show the way to develop wheels which will resist both thermal checking and shelling.

It is true that the smaller wheel is punished somewhat more severely, but we should not over-estimate this, because, if you will remember, in the Locomotive Committee's report last week, they are now recognizing that shelling in driving tires is a very serious problem, and there you have a very large wheel. So we can't hope to get very much relief through slightly increasing the size of the wheel.

Mr. Sillcox emphasized the importance of the concentricity of wheels. Here again your Wheel Committee has advocated and insisted on improvement along this line for many



The Susquehanna River Stone Arch Bridge on the Pennsylvania Near Harrisburg, Pa.—First Section of the Special from New York to the Altoona Shops on May 16 for Members of Railway and Locomotive Historical Society and National Railway Historical Society

years. There are very few roads today which have recognized this as it should be recognized. I think you will find the Wheel Committee has said that all new passenger-car wheels should be put in a lathe or grinder after mounting in order to turn or grind them so that they will be truly concentric. I do not believe it would be an over-statement to say that many wheels are actually being put in passenger-car service that are non-concentric by as much as $\frac{1}{8}$ in. This gives bad riding conditions and bad wheel service.

Balancing is also important, but unfortunately at the present time it is a very expensive procedure, due primarily to lack of equipment by the manufacturers. As high-speed operation increases I believe that this will be given more attention and equipment will be provided which will permit a

proper balancing of wheel and axle assemblies, without the undue expense.

In general, it is my firm belief that the day of the light-weight passenger car is here. In fact, the term light-weight passenger car or passenger train is almost synonymous with extremely high speed, particularly in western territory, where there are many mountain grades.

In the case of freight cars, I agree with the author that the development will be somewhat slower, but with the advantage in the relative cost of alloys and plain carbon steel it appears that the day of the light-weight freight car is approaching more rapidly than we have thought, and I feel there will be a great deal of development and actual construction of such cars in the near future.

Report of Arbitration Committee

Few effective dates for rule requirements extended —
Defect carding for minor details reduced



W. H. Flynn
Chairman

There is nothing in the rules to prevent a car owner using non-standard journal box packing under his own cars if he so elects, regardless of the fact such cars move in interchange service. Upon suggestion by the Committee on Lubrication of Cars and Locomotives, a new requirement is recommended under Rule 3 to provide that effective January 1, 1940, journal box packing must be prepared and boxes repacked in accordance with A.A.R. Standard practice under all cars offered in interchange by the owner.

No further extension in effective dates beyond January 1, 1938, is recommended for six requirements in

Freight Rule 3 pertaining to axles under 70,000-lb. capacity cars, brake-beam hangers with eyes not formed solid, head-block anchorage on tank cars, wood shims between longitudinal anchorage and underframe on tank cars, dome covers secured by hinge or chain and acceptance from owner of loaded Class I tank cars. Recommendation is included, however, to modify the last requirement to permit acceptance of Class I tanks mounted on underframes meeting at least Class II requirements.

No further extension in effective dates beyond January 1, 1938, is recommended for the requirement in Passenger Rule 2 which provides that cars of passenger carrying equipment must be equipped with metallic steam heat connectors.

The committee has received no requests for extension of these effective dates and feels ample time has elapsed to permit compliance.

In response to complaints from various railroads and railroad clubs as to the necessity for defect carding for slight damage, an investigation and field study has been completed under the direction of the committee. As a result, modifications in Rule 4 are recommended which it is felt will eliminate considerable defect carding for minor defects which do not affect the utility or serviceability of the car. The report of the Special Subcommittee on Defect Carding for Minor Defects is printed as Appendix A to this report.

It is felt the present situation does not justify further extension of the extended time limits in Rules 5, 87 and 94 with respect to billing for repairs authorized by defect card or wrong repairs. Recommendation is also included to modify these rules to require that certain wrong repairs, such as bolts in place of rivets, wrong size bolts and pins, etc., must be corrected within one year from date made, to justify bill. Otherwise, it is considered car owner has received sufficient service from the details to justify the cost thereof.

A study of the subject of depreciation limits and depreciation rates for destroyed or badly damaged cars has been completed under the direction of the committee. Modification of Rule

112 is proposed in accordance with the facts developed which it is recommended be referred to letter ballot. The report of the special subcommittee is printed as Appendix B to this report.

The committee does not feel that any of the other modifications included in its report necessitates submission to letter ballot, the majority of them being routine and covering changes recommended by the Committee on Brakes and Brake Equipment, Committee on Specifications for Materials, Committee on Loading Rules and Committee on Wheels, extensions of effective date for various requirements and changes necessitated by letter-ballot action last year.

In its 1934 report your committee directed attention to the necessity for stenciling car initials and numbers on trucks, to facilitate identification, as recommended in Sec. L of the A.A.R. Manual of Standard and Recommended Practice. Complaints continue to be received as to difficulties being experienced in identifying trucks with their car bodies, due to omission of such stenciling, in cases of accident. The attention of all car owners is again directed to the importance of such stenciling.

All recommendations for changes in the rules of interchange submitted by members, railroad clubs, private car owners, etc., have been carefully considered by the committee and, where approved, changes have been recommended.

Attention is again directed to the fact that the Arbitration Committee will not consider questions under the Rules of Interchange unless submitted in the form of Arbitration Cases as per Rule 123.

Freight-Car Rules

RULE 2

The committee recommends that first paragraph of Section (c) of this rule be modified as follows:

Proposed Form—(c) Cars improperly loaded (not complying with the Rules Governing the Loading of Commodities on Open Top Cars) when transfer or rearrangement of lading is necessary, even though the load may have originally conformed to such rules, *unless accompanied by authority for adjustment or rearrangement of lading.*

Reason—To clarify the intent in accordance with general practice.

RULE 3

The committee recommends that effective dates for various requirements in the present rule, as listed below, now set at January 1, 1938, be extended to January 1, 1939:

Sec. (b), Par. (7)—Metal badge plate showing dimensions of brake levers.

Sec. (b), Par. (8)—Bottom-rod and brake-beam safety supports.

Sec. (b), Par. (9)—Braking power.

Sec. (j), Par. (2)—Pressed-steel journal boxes.

Sec. (r), Par. (3)—Hatch covers to be secured by hinges.

Reason—The present situation justifies these extensions.

The committee recommends that no further extension beyond January 1, 1938, be granted for effective dates of the following requirements:

Sec. (a), Par. (7)—Axles under 70,000-lb. capacity cars.

Sec. (b), Par. (6)—Brake-beam hangers with eyes not formed solid.

Sec. (t), Par. (8)—Head-block anchorage on tank cars.

Sec. (t), Par. (9)—Wood shims between longitudinal anchorage and underframe, on tank cars.

Sec. (t), Par. (14)—Dome covers secured by hinge or chain, on tank cars.

Sec. (t), Par. (16)—Class I tank cars prohibited.

Reason—These requirements have been in the rules for a number of years and it is felt sufficient time has elapsed to permit compliance therewith and that no further extension of effective dates is justified.

Note—Under date of March 28, 1936, executives of railroads and private car lines were advised of decision by the Board of Directors of the Association that the effective date of requirement contained in Par. (4) of Sec. (t) of this rule, prohibiting acceptance from owners of cars with arch-bar trucks on and after January 1, 1938, would not be further extended.

The committee recommends that a new third paragraph be added to Sec. (j) of this rule and included in the next supplement, to read as follows:

Proposed Form—(3) *Journal boxes, repacking of: Effective January 1, 1940, packing for journal boxes must be prepared and boxes repacked in accordance with A.A.R. Standard Practice as defined in Rule 66, on all cars. From owners.*

Reason—Sufficient time has elapsed since the adoption of this Standard to justify the above requirement for cars moving in interchange service.

The committee recommends that Par. (16) of Sec. (t) of this rule be modified in the next supplement, as follows:

Proposed Form—Tank cars. Effective January 1, 1938, no tank car of Class I construction will be accepted under load unless such Class I tank is mounted on underframe meeting at least Class II underframe requirements. In interchange.

Reason—It is felt this restriction should not apply to tank cars with underframes meeting requirements of Class II specifications.

The committee recommends that first note following Par. (2), Sec. (w) of this rule be modified in the next supplement, as follows:

Proposed Form—*Note*—The letters "A.A.R." shall not be put on any cast-iron wheel which is of less weight than the standards of the A.A.R., or any wheels which are made to specifications with requirements less than those prescribed in A.A.R. Specifications. Cast-iron or wrought-steel wheels marked "A.A.R.X.", indicating experimental wheels authorized by the A.A.R. Committee on Wheels, will be accepted in interchange.

Reason—To eliminate from service any wheels made to a specification with requirements less than those prescribed in the A.A.R. specifications and to provide for marking for authorized experimental wheels, as recommended by the Committee on Wheels.

RULE 4

The committee recommends that Sections (c), (d) and (f) of this rule be modified as follows:

Proposed Form—(c) *All-Steel house cars.*—Any or all of the following parts, namely, metal posts, metal braces, metal sheets, metal slats:

(1) *Cut through the thickness of the metal. (Flanges only, cut through, will not be cardable.)*

(2) *Bent inwardly 1½ in. or more, or if bulb portion only of pressed-steel parts is bent inwardly 1½ in. or more. (Flanges only, when bent, will not be cardable except where necessary to repair under conditions referred to in Par. 3).*

(3) *Bent inwardly less than 1½ in., but necessary to repair for proper operation of door, or to comply with Safety Appliance requirements or to restore alignment of bolt holes, rivet holes, or joints for welding, or to repair cardable directly associated damaged parts.*

(d) *Other house cars.*—When sheathing is split or broken, or when raked into tongue.

Note—It is understood that adjacent raked sheathing if not split or broken will not be cardable unless raked into tongue, except that on refrigerator cars adjacent sheathing raked to bottom of bead will also be cardable.

(f) *Open-Top Cars.*—Any or all of the following parts, namely, metal posts, metal stakes, metal braces, metal top chord angles, or their substitutes, metal sheets, metal slats:

(1) *Bent inwardly 3 in. or more, or if bulb portion only of pressed steel parts is bent inwardly 3 in. or more. (Flanges only, when bent, will not be cardable except where necessary to repair under conditions referred to in Par. 2.)*

(2) *Bent inwardly less than 3 in., but necessary to repair for proper operation of door or gate, or to comply with Safety Appliance requirements, or to restore alignment of bolt holes, rivet holes, or joints for welding, or to repair cardable directly associated damaged parts.*

(3) *Metal sheets and metal slats, cut through the thickness of the metal to the extent of 2 in. by 1-in., or equivalent area.*

(4) *Metal posts, metal stakes, metal braces, or their substitutes: Metal cut through to a depth of more than one-third from outer edge to inner edge, on two or more of any of these members on same side of car. (Flanges only, cut through, will not be cardable.)*

(5) *Metal top-chord angles or their substitutes on gondola cars: Holes, drilled or burned through the thickness of the metal in the horizontal leg exceeding 1½ in. in diameter each, or exceeding ½ in. by 2½ in. each lengthwise of the car. Holes of any size drilled or burned in metal top-chord angles or their substitutes on hopper cars are cardable.*

Reason—To eliminate defect carding for minor details which do not affect the utility or serviceability of the car. See Appendix A.

RULE 5

The committee recommends that second paragraph of this rule be modified to read as follows:

Proposed Form—To justify bill, repairs authorized by defect card must be made within two years from date of first receipt of car on home line, except wrong repairs, which must be corrected within nine months from date of first receipt of car on home line. However, if wrong repairs of brake hangers, bolts in place of rivets or wrong size bolts or pins, are not corrected within nine months from date of first receipt of car on home line and within one year from date of such wrong repairs, bill for correcting same is prohibited.

Reason—The present situation does not justify a further extension of the extended time limits of this rule. It is felt car owner has received sufficient service from these details within the period specified to justify the cost thereof.

RULE 9

The committee recommends that requirements opposite item of "Brake beams, R. & R." be rearranged and modified, effective August 1, 1937, as follows:

Proposed Form—Location number (see Rule 14).

A.A.R. and number of same, or non-A.A.R.

New, or secondhand, or R. S. S. & T. (indicating repaired and tested per A.A.R. Standard Specifications for Repairs to Freight Equipment Brake Beams).

Note—Brake beams repaired and tested in accordance with these Specifications must be identified with a dash of white paint on the fulcrum between the lever slot and compression member.

Reason—To harmonize with revised Rules 17, 101 and 104, because of adoption by letter ballot as Standard Practice of Specification for Repairs to Freight Equipment Brake Beams, as recommended by the Committee on Brakes and Brake Equipment.

RULE 17

The committee recommends that Sec. (d) of this rule be modified as follows:

Proposed Form—(d) Bolts substituted for rivets, where rivets are the standard of the car, are considered as improper

repairs, except where used in securing ladders, ladder treads, handholds, sill steps and uncoupling lever brackets, exclusive of the tank, or metal jacket on tank, of tank cars, also for securing carrier irons and follower straps on tank cars; bolts should not be used for securing safety appliances on the tank or metal jacket of tank. The substitution of bolts for rivets, or bolts used as rivets (with bolthead, other end riveted), in coupler yoke, is considered as temporary repairs, no charge for the labor (including coupler R. & R.) nor material directly involved, other than coupler and yoke; in case of delivering line defects, the car must be defect carded for such yoke bolts.

Reason—As a safety measure, account majority of tank cars engaged in transporting inflammable liquids.

The committee recommends that Sec. (e) of this rule be modified, effective August 1, 1937, by eliminating the letters "S. H." opposite Items 2, 5 and 6 in the "Charge Material" column of the brake beam substitution table.

Reason—To harmonize with changes in Rules 9, 101 and 104.

The committee recommends that a new Section (k) be added to this rule, effective August 1, 1937, to read as follows:

Proposed Form—(k) *Extra-heavy pipe fittings may be substituted for single-weight type, or vice-versa, as correct repairs, and charge based on type of fittings applied.*

Reason—As an economy measure, to eliminate carrying stocks of various types of fittings. In the case of a car equipped with mixed fittings, it is frequently impossible for repair forces to determine which type is standard to car.

The committee recommends that a new last paragraph be added to Interpretation 23 to this rule, effective August 1, 1937, to read as follows:

"For repairs made on and after August 1, 1937, where car is equipped with brake-beam safety supports of a type requiring sliding chair castings, billing repair card must show in cases of brake beam renewal (except account missing beam) whether the beam removed was equipped with unit or hinge type sliding chair castings; otherwise repairing line must furnish defect card for labor and material for application of said castings upon presentation of joint evidence that the beam applied is not so equipped."

Reason—To further protect car owner against failure to transfer hinge type chair castings when brake beams are renewed.

RULE 19

The committee recommends that last item under this rule (prohibitive repairs) be modified, effective August 1, 1937, as follows:

Proposed Form—Cast-iron wheels which have been condemned by out-of-round Rule 73-A, if reclaimed by grinding.

Reason—Because of the change in Rule 73-A. This restriction applies only to cast-iron wheels.

The committee recommends that a new item be added to this rule, to read as follows:

Wheels, cast-iron, double-plate design, if cast prior to January 1, 1921.

Reason—As a safety measure, as recommended by the Committee on Wheels.

RULE 31

The committee recommends that Section (b) of this rule be modified as follows:

Proposed Form—(b) Where weight of car is changed 300 lb. or more (for refrigerator cars 500 lb. or more), account repairs of delivering company's defects, the expense of re-light-weighting and re-marking will be charged to party responsible for such defects, unless 24 months have expired since date of previous re-weighting.

Reason—Car owner should properly assume expense of re-weighting after the expiration of the 24 months permissible re-weighting period, irrespective of responsibility for repairs to car.

RULE 32

The committee recommends that first and second paragraphs of this rule be modified as follows:

Proposed Form—Dome covers (includes the Mack non-detach-

able lock if missing with dome cover), bottom outlet valve chamber caps, safety valves or safety vents missing from tank cars, except insulation dome jacket (cheese box) covers from domes of insulated tank cars.

Valve or cock attached to bottom outlet valve chamber or to outlet valve-chamber cap, if missing, providing car is stenciled "Valve attached to outlet."

Reason—To clarify the intent.

The committee recommends that first sentence of sixth paragraph of this rule be modified as follows:

Proposed Form—Removing or cutting out parts of car to facilitate loading, unloading or for other purposes, except holes not exceeding 1½ in. diameter each or ½ in. by 2½ in. each in sides or ends of gondola cars, or 1½ in. diameter each in floors of gondola cars, or 4½ in. diameter each in floors of flat cars, for the purpose of securing lading in compliance with the Rules Governing the Loading of Commodities in Open-Top Cars.

Reason—To provide for holes necessary for loading purposes, as recommended by the Committee on Loading Rules.

The committee recommends that a new sentence be added to the answer to Interpretation 2 to this rule, effective August 1, 1937, to read as follows:

(2) Q—Who is responsible for paint missing in spots, due to hot lading having been loaded in cars or to fires built to thaw out frozen loads to facilitate unloading?

A—Rule 32, Sec. (k), applies. However, defect card shall not be required for fire damage on hopper or gondola cars, unless hopper door or drop door or any of the attachments to same, are warped or bent, or if air brake is damaged, or if any stenciling is rendered illegible, or if any wooden part is burned to a depth of ⅛ in. or more. Likewise, defect card shall not be required for such fire damage on tank cars unless the outlet valve or air brake or running board is damaged, or if any stenciling is rendered illegible.

Reason—It is felt fire damage from this source to the above extent should consistently be the responsibility of car owner, to harmonize with classification of similar damage on gondola and hopper cars.

RULE 36

The committee recommends that Sec. (6) of this rule be modified, effective August 1, 1937, as follows:

Proposed Form—(6) Railroad Cards.—Dimensions, use, text and method of application may be prescribed by individual roads to suit their own requirements. Red printing or red background is prohibited, with the exception of the words "Warning" and "Poisonous Fumes" on warning cards for heated cars.

Reason—To comply with requirements of the National Perishable Freight Committee's Circular 20-A.

RULE 44

The committee recommends that Sec. (1) of this rule be modified as follows:

Proposed Form—(1) Wooden underframe cars.—When five or more longitudinal sills are broken new. (Any sill partly broken or split old at point of breakage will not be considered in this combination.)

Reason—It is felt that a wooden sill with a split old defect should be placed in the same category as a sill partly broken old insofar as determination of combination damage is concerned.

The committee recommends that this rule be modified as follows:

Proposed Form—All-steel underframe cars shall not be accepted from owner with one or both metal center sills broken between bolsters, or one or both center sills bent between bolsters when deflection is in excess of 1½ in., unless defect card of car owner is attached to car. (Etc.—no other change.)

Reason—To clarify the intent that this rule does not apply to composite wood and steel underframe cars.

RULE 49

The committee recommends that Sections (a), (c) and (d) of this rule be modified, and interpretation under the rule eliminated, effective August 1, 1937, as follows:

Proposed Form—(a) All-steel cars not equipped with one

cardboard or suitable receptacle for the accommodation of defect, information and joint evidence cards. (etc.)

Proposed Form—(c) All-steel box and steel-sheathed refrigerator cars not equipped with cardboards for special explosive and other placards, as required by the I.C.C. Same to be located on side doors and both ends of car. (On refrigerator cars, they shall be located adjacent to side doors but must not be concealed when doors are in open position.) Size not to be less than 16 by 24 in.

(d) On steel cars, all cardboards must have their brackets secured to car by welding, or with rivets, or with bolts with ends riveted over nuts.

Reason—To provide for placard boards and standard location for same on all-steel refrigerator cars in accordance with I.C.C. Regulations:

RULE 64

The committee recommends that second paragraph of this rule be modified as follows:

Proposed Form—No charge shall be made for application of separate common nuts unless such nuts are fully tightened, and, where applied to journal-box bolts, column bolts, brake-hanger bolts or carrier-iron bolts, such common nuts must be secured with nut lock or lock nut.

Reason—It is felt this requirement should reasonably be extended to carrier-iron bolts.

RULE 73-A

The committee recommends that this rule and notes following be modified, effective August 1, 1937, as follows:

Proposed Form—Out-of-round: Cast-iron, cast-steel or wrought-steel wheels: See par. 103 and Fig. 76 in Wheel and Axle Manual for identification of this defect. Any wheel that is out of round in excess of $\frac{1}{16}$ -in. within an arc of 12 in. or less is condemned by the Out-of-round Gage Fig. 76-A of the Wheel and Axle Manual.

Note—In the use of this gage the center projection shall not be inserted into any shelled out, comby or slid flat spot. This gage should be applied to approximately center line of tread.

Note—Out-of-round cast-iron wheels, if reclaimed by grinding, must not be applied to foreign cars.

Reason—To clarify the intent that this defect applies to all types of 33-in. freight-service wheels, also with respect to method of application of gage, as recommended by the Committee on Wheels.

RULE 83

The committee recommends that this rule be modified as follows:

Proposed Form—The application of cast-iron wheels (regardless of date cast), of nominal weight less than 750 lb. to axles having journals 10 in. long or over, 700 lb. to axles having journals 9 in. long or over and 650 lb. to axles having journals 7 in. long or over; or cast-iron wheels without any weight cast thereon; or double plate cast-iron wheels cast prior to January 1, 1921; is prohibited.

Such wheels shall not be removed for any of these causes alone, but shall be scrapped regardless of condition when removed for any defect on mate wheel or axle, and the weight or date as cast on wheel when shown on billing repair card will be sufficient authority for rendition of bill. (See Rule 98, Section (c-3), for charges and credits.)

Reason—Account change in Rule 19, listing double-plate cast-iron wheels cast prior to January 1, 1921, as prohibitive repairs.

RULE 87

The committee recommends that Sec. (a) of this rule be modified as follows:

Proposed Form—Any company making improper repairs by using material which the repairing line should carry in stock, as prescribed in Rule 122, is solely responsible to the owners, with the exception of the cases provided for in Rule 57. Such

improper repairs must be corrected within nine months after first receipt of car on home line, to justify bill. However, if wrong repairs of brake hangers, bolts in place of rivets or wrong size bolts or pins, are not corrected within nine months from date of first receipt of car on home line and within one year from date of such wrong repairs, bill for correcting same is prohibited. In all cases of improper repairs where defect card is attached to car, a notation to that effect should be made on the billing repair card.

Reason—The present situation does not justify a further extension of the extended time limit of this rule. It is felt car owner has received sufficient service from these details within the period specified to justify the cost thereof.

RULE 94

The committee recommends that first paragraph of this rule be modified as follows:

Proposed Form—For repairs made on authority of A.A.R. defect card, the defect card, together with a billing repair card, must accompany the bill, subject to requirement that repairs must be made within two years from date of first receipt of car on home line, except wrong repairs which must be corrected within nine months from date of first receipt of car on home line, to justify bill. However, if wrong repairs of brake hangers, bolts in place of rivets or wrong size bolts or pins, are not corrected within nine months from date of first receipt of car on home line and within one year from date of such wrong repairs, bill for correcting same is prohibited. In the case of repairs covered by defect card, if the owner changes the original standard of parts so involved, the charge must be no greater than if the original design had been followed.

Reason—The present situation does not justify a further extension of the extended time limits of this rule. It is felt car owner has received sufficient service from these details within the period specified to justify the cost thereof.

RULE 98

The committee recommends that Sec. (c) Par. (3) of this rule be modified as follows:

Proposed Form—On basis of Rule 83, cast-iron wheels, regardless of cast date, of nominal weight less than 650, 700 or 750 lb. cast thereon, or without nominal weight cast thereon, or double-plate cast-iron wheels cast prior to January 1, 1921, shall be credited as scrap, regardless of condition, when removed from service, at expense of car owner in all cases, except as provided for in Rule 68, last paragraph of Rule 81, and in cases where one such wheel is broken in derailment when the broken wheel will be credited as scrap at expense of handling line, and such mate wheel, if undamaged, will be credited as scrap at expense of car owner. In such case, the nominal weight or the date as cast on the wheel, or notation "no cast weight" shall be shown on billing repair card to justify scrap credit. Any such wheels applied shall be considered at scrap value under all conditions.

Reason—Account change in Rule 19, listing double-plate cast-iron wheels cast prior to January 1, 1921, as prohibitive repairs.

The committee recommends that the guarantee provision in Interpretation 10 to this rule, be extended to include the out-of-round defect described in Rule 73-A, this modification to appear in the next supplement and be applicable to wheels applied on and after August 1, 1937.

Reason—It is felt the guarantee should reasonably be extended to this defect which is classifiable as a wear condition, as recommended by the Committee on Wheels.

RULE 104

The committee recommends that Sections (g), (h) and (k) of this rule be modified, effective August 1, 1937, as follows:

Proposed Form—(g) Metal brake beams when used in repairs shall be charged at prices shown in Rule 101, except as provided in Sec. (e) of Rule 17. Defective metal brake beams removed shall be credited at average credit price for such beams. In the case of missing beams, credit shall be allowed at average credit price according to class of beam applied.

(h) Where a metal brake beam is removed, repaired in ac-

accordance with A.A.R. Specification and Test for Repairs to Freight Equipment Brake Beams and re-applied, the charge shall be based on allowance provided in Rule 101, less average credit price for same, without additional labor charge for repairing the beam. Otherwise note following Item 213 of Rule 101 applies.

(k) A.A.R. brake beam without optional jaw for third-point suspension, if removed in good condition, when replaced with beam having such extension jaw, where the latter is standard to car, shall be credited at average credit price, per Rule 101.

Reason—Because of the adoption by letter ballot as Standard Practice of Specification for Repairs to Freight Equipment Brake Beams, as recommended by the Committee on Brakes and Brake Equipment.

The committee recommends that a note be added to Item 17 "Truck Springs" in Sec. (1) of this rule and included in the next supplement, to read as follows:

NOTE:—Coil truck springs, secondhand (which includes re-conditioned springs), applied to foreign cars, must not have permanent set exceeding $\frac{1}{2}$ in. below the new nominal free height. However, this limit shall not be considered as authority to remove springs from service. When repairs are made account inner or outer coil broken, the unbroken coil shall not, unless otherwise defective, be renewed at car owner's expense if same meets the above requirement.

Reason—To establish a reasonable limit for secondhand classification of springs due to permanent set and to prevent removal of coil springs (especially inner coils) which are not otherwise defective.

RULE 108

The committee recommends that the following item be added to Section (a) of this rule, effective August 1, 1937:

Auto loading devices: Tightening or adjusting parts, where renewing, straightening or welding is not involved.

Reason—It is felt this expense should properly be assumed by the handling line.

RULE 112

The committee recommends that depreciation limits appearing in Par. 6 (a) of Sec. A of this rule, be modified as follows:

For non-rebuilt cars, depreciation shall not exceed the following percentages of reproduction cost:

Class	Box, stock and poultry		Hopper and all open top		Flat		Tank cars		Refrigerator	
	Pres-limit	Pro-posed limit	Pres-limit	Pro-posed limit	Pres-limit	Pro-posed limit	Pres-limit	Pro-posed limit	Pres-limit	Pro-posed limit
A	60.00	90.00	60.00	80.00	60.00	85.00	60.00	90.00*	60.00	90.00
B	60.00	90.00	60.00	90.00	...	...	...	...	60.00	90.00
C	70.00	90.00	70.00	90.00	...	...	...	...	70.00	90.00
D	70.00	90.00	70.00	90.00	70.00	85.00	...	...	70.00	90.00
E	80.00	90.00	80.00	90.00	80.00	85.00	...	...	80.00	90.00

* This includes tank cars of all classes.

The committee also recommends that depreciation rates appearing in Par. 1, Sec. D of this rule, be modified as follows:

The following rates of depreciation, on straight-line basis, will be used in arriving at settlement values for destroyed or badly damaged rebuilt or non-rebuilt cars subject to the depreciation limits set forth in Section A-6:

Class	Box, stock and poultry		Hopper and all open top		Flat		Tank		Refrigerator	
	Pres-rate per cent	Pro-posed rate per cent	Pres-rate per cent	Pro-posed rate per cent	Pres-rate per cent	Pro-posed rate per cent	Pres-rate per cent	*Pro-posed rate per cent	Pres-rate per cent	Pro-posed rate per cent
A	3.00	2.60	3.00	2.65	3.00	3.00	3.00	3.00	3.00	3.50
B	3.00	3.25	3.00	3.60	...	...	...	...	3.00	4.00
C	3.00	3.25	3.00	3.70	...	...	...	...	3.00	4.25
D	3.50	3.50	3.50	4.00	3.50	4.50	...	...	3.50	4.50
E	3.75	3.75	3.75	4.50	3.75	4.75	...	...	3.75	4.75

* Includes tank cars, all-steel, with tanks for non-corrosive commodities. Tank cars, all-steel, with tanks for corrosive commodities, 5 per cent depreciation rate.

All other classes, 4 per cent depreciation rate.

Reason—To provide equitable average depreciation limits and depreciation rates for use in settlement for destroyed and badly damaged cars. See Appendix B.

RULE 114

The committee recommends that first paragraph of this rule be modified as follows:

Proposed Form—If the company on whose line the car is destroyed elects to repair the car, the original plan of construction must be followed, and the original kind and quality of materials used except that steel draft members extending full length of car, steel center sills or steel underframe should be applied and be of such design as will meet the recommended practice of the Division for reinforcing existing cars.

Reasons—Acceptance of Class E-4 cars from owners is prohibited under Rule 3. It is also felt that additional first application of transom draft gears should not be encouraged.

RULE 120

The committee recommends that first paragraph of Sec. (f) of this rule be modified as follows:

Proposed Form—If car owner authorizes repairs, the original plan of construction must be followed and the original kind and quality of materials used, except that steel draft members extending full length of car, steel center sills or steel underframe should be applied and be of such design as will meet the recommended practice of the Division for reinforcing existing cars. Wooden longitudinal sills may, at the option of the repairing line, be spliced as per provisions of Rule 22.

Reason—Acceptance of Class E-4 cars from owners is prohibited under Rule 3. It is also felt that additional first application of transom draft gears should not be encouraged.

RULES 126 AND 127

The committee recommends that Rule 126 be abrogated and Rule 127 modified as follows:

Proposed Form—This Code of Rules shall be introduced for discussion and revision at one session of the annual meeting of the Mechanical Division, Association of American Railroads, each year. In the revision of these rules at the annual meeting, a two-thirds vote of the members present shall be necessary for adoption.

Reason—To clarify the intent. Propositions submitted to letter ballot vote are subject to Sec. 9 (b) of the Mechanical Division's Rules of Order.

RULE 129

The committee recommends that this rule be abrogated due to the fact that membership in the association is not a requisite for execution of the Interchange Agreement. Rule 128 covers.

Passenger-Car Rules

RULE 2

The committee recommends that no further extension beyond January 1, 1938, be granted for effective date of requirement shown in second sentence of Sec. (c) of this rule, pertaining to metallic steamheat connectors on passenger-carrying cars.

Reason—It is felt that sufficient time has elapsed to permit compliance with this requirement and that no further extension of effective date is justified.

RULE 4

The committee recommends that the effective date of second paragraph of this rule, with reference to equipping all-steel or steel-underframe cars with cardboards or suitable receptacle for the accommodation of defect and joint evidence cards, now set at January 1, 1938, be extended to January 1, 1939.

Reason—The present situation justifies this extension.

RULE 9

The committee recommends that note following Sec. (f) of

this rule (line service expense items) be modified, effective August 1, 1937, as follows:

Proposed Form—NOTE.—Cost of precooling cars by mechanical device, also cost of servicing air-conditioning equipment (labor and material), are line service expenses, but may be charged only in case of special agreement by parties comprising line. All necessary repairs made, including charging and flushing of batteries, are chargeable to car owner.

Reason.—To properly allocate responsibility for the expenses involved.

RULE 10

The committee recommends that a new Item 6 be added to this rule (interchange service expense items to be assumed by handling line), effective August 1, 1937, as follows:

Proposed Form—Air conditioning equipment Labor: and material expense for ice, water, lubricants, steam, gas and cost of precooling cars by mechanical device, also labor of testing and inspection, blowing out grilles, ducts, etc. (All necessary repairs made, including charging and flushing of batteries, are chargeable to car owner.)

Reason.—To properly allocate responsibility for the expenses involved.

RULES 23, 24, 25 AND 26

The committee recommends that new Rules 23 and 24 be added, and present Rules 23 and 24 relocated as Rules 25 and 26, as follows:

Proposed Form—Rule 23. This Code of Rules shall be introduced for discussion and revision at one session of the annual meeting of the Mechanical Division, Association of American Railroads, each year. In the revision of these rules at the annual meeting, a two-thirds vote of the members present shall be necessary for adoption.

Proposed Form—Rule 24. Any car owner or railway company may become a party to this Code of Rules by executing the standard form of passenger car interchange rules agreement.

Rule 25. Acceptance or rejection of this Code of Rules must be as a whole, and no exception to an individual rule or rules shall be valid.

Rule 26. This Code of Rules shall become effective January 1, 1938.

Reason.—To harmonize with the Freight-Car Code.

The report was signed by W. H. Flynn (chairman), general superintendent motive power and rolling stock, New York Central; C. T. Ripley (vice-chairman), chief mechanical engineer, Atchison, Topeka and Santa Fe; T. W. Demarest, general superintendent motive power, Pennsylvania; A. E. Smith, vice-president, Union Tank Car Company; J. J. Hennessey, assistant superintendent car department, Chicago, Milwaukee, St. Paul and Pacific; L. Richardson, mechanical assistant to vice-president and general manager, Boston and Maine; G. E. McCoy, assistant general superintendent car equipment, Canadian National; M. F. Covert, general superintendent of equipment, General American Transportation Corporation.

Appendix A—Report of Subcommittee on Minor Defect Carding

As directed, your subcommittee has made field studies at Chicago, St. Louis, Kansas City, Twin Cities, Youngstown and Tulsa. Checks were made at the first five points of all defect cards issued at such terminals during the month of September, 1935. This month was selected because it represented the last change made in Rule 4 and for the further reason that it was felt all investigation and correspondence concerning defect cards of this period would have been completed and the defect-card stubs would by now be in the files. A check with particular reference to tank-car damage was made at owner's plants and railroad yards at Tulsa, Okla.

The information gathered from these studies is shown in five exhibits (not included with this report on account of space limitations) as follows: Exhibit 1—Wood-Sheathed Refrigerator

Cars; Exhibit 2—Wood-Sheathed Box Cars; Exhibit 3—House and Refrigerator Cars of All-Steel or Steel Outside Framing; Exhibit 4—Open Top Cars of All-Steel or Steel Outside Framing; Exhibit 5—Tank Cars.

This subcommittee report was signed by J. E. Mehan (chairman), A. G. Lyon, H. N. Shaw and L. W. Schollmeyer.

Appendix B—Report on Depreciation Limits and Depreciation Rates for Destroyed or Badly Damaged Cars

Your sub-committee appointed to study the subject of depreciation limits for freight cars and make recommendation of such limits for use in connection with Interchange Rule 112, settlement for destroyed and badly damaged freight cars, begs to report as follows:

Information was secured from the Bureau of Accounts, Interstate Commerce Commission, about freight car depreciation limits and freight car depreciation rates for eighteen selected railroads. This information was collected by the commission in connection with its Docket 15100. The eighteen railroads selected were as follows: Atlanta, Birmingham & Coast; Atlantic Coast Line; Atchison, Topeka & Santa Fe; Baltimore & Ohio; Chicago & Eastern Illinois; Chicago, Burlington & Quincy; Chicago, Milwaukee, St. Paul & Pacific; Delaware & Hudson; Illinois Central; Minneapolis & St. Louis; Missouri-Kansas-Texas; Missouri Pacific; New York Central; New York, Chicago & St. Louis; New York, New Haven & Hartford; Norfolk & Western; Pennsylvania; Wabash.

These are the same railroads that were selected for the survey of the cost of billing for repairs to foreign cars. They represent approximately 52 per cent of the ownership of railroad-owned freight cars of the country. These roads were chosen for this study because they consist of large roads, medium-sized roads and small roads and also because they constitute a representative cross section of the country geographically. Similar information was also obtained from the Canadian Pacific, in order that one of the large Canadian lines would be represented in the survey.

There was also available for the use of your committee, information collected by the Association in its recent surveys of



ownership costs of private-line cars. In addition to this data, some of the tank-car owners furnished the committee information about their cars.

[Detail data secured by the committee were presented in 14 exhibits, not included in the present abstract on account of space limitations. The subcommittee recommends no change in present depreciation rates or depreciation limits for passenger cars. Not enough data were available upon which to base a recom-

mendation for depreciation limits and depreciation rates for rebuilt cars any different from those proposed by the committee for non-rebuilt cars.—Editor.]

The sub-committee report is signed by A. E. Calkins (chairman), C. T. Ripley, M. F. Covert, T. J. Boring and J. E. O'Brien.

(Upon a motion, duly seconded, the report was accepted, and the recommendation covering Rule 112 referred to letter ballot.)

Report on Prices for Labor and Material

Changes in Freight-Car Rules 101, 107 and 112 and Passenger Rule 22 reflect upward trend in material prices



A. E. Calkins
Chairman

All miscellaneous material prices in Rule 101 were rechecked as of March 1, 1937, quotations from purchasing agents of the ten selected railroads, representing 39 per cent of total freight car ownership in the United States and Canada, indicating a general upward trend in material markets as indicated by detail recommendations for revisions shown under this rule.

The note preceding Item 69 is modified to permit charge for extra heavy pipe fittings when applied, irrespective of the kind of fittings removed or standard to the car, to harmonize with revision of Rule 17 as recommended by the Arbitration Committee.

Prices for secondhand brake beams and average credit allowances have been established on the basis of Specification for Repairs to Freight Equipment Brake Beams adopted as Standard Practice by letter ballot last year. New note is added following Item 213 to provide that secondhand beams which have not been reworked or repaired, and tested and marked in accordance with the requirements of this Specification, if applied to foreign cars, shall be charged at the average credit allowance.

In order to discourage the use of non-approved types of draft gears in cases where approved types are proper substitutes and to establish equitable secondhand and credit allowances in comparison with approved type draft gear prices, with the concurrence of the Arbitration Committee, prices for new non-approved friction draft gears of 24½-in. pocket spacing have been arbitrarily established at 75 per cent of new value of approved type gears, based on length of gear. This eliminated the last clause of first paragraph of the note under the heading "Friction Draft Gears" on page 177. A new sentence has been added to third paragraph of the same note, to clarify the intent with respect to charge for Cardwell draft-gear springs. Four additional types of non-approved draft gears are added to Section II of the table and one type of gear transferred from Section II to the obsolete classification. One type of gear is transferred from Section II to Section I because of having passed the required tests for approved type gears.

No change in labor rates is recommended, pending announcement of final action with respect to the Railroad Retirement Act.

Rule 107

Item 47-A is modified to permit a charge for drilling hole for

In order that the rules may currently provide an equitable basis for inter-road billing, your committee has continued the work of analyzing material, labor and new equipment costs in A.A.R. Interchange Rules 101, 107, 111 and 112 of the Freight Car Code, and Rules 21 and 22 of the Passenger Car Code, with a view of determining and recommending necessary changes to be made in the next supplement to the current Code.

Rule 101

A.A.R. type retainer in coupler key, regardless of whether other repairs are required, for the reason this retainer (or approved equivalent) is now an interchange requirement under Rule 3.

Items 50 and 51 are modified to clarify the intent.

As the result of time studies conducted under the direction of the Committee, the fourth note following Item 281 is modified to provide a simple method of computing charge for tack or fillet welding on freight cars or automobile loading racks and their devices.

Rule 112

Recommendations are made in this rule respecting reproduction pound prices of new freight train cars of all classes, in order that Supplement of August 1, 1937, may reflect 1936 costs in lieu of figures shown in the present Code. New prices recommended are based on costs of approximately 26,000 freight cars constructed during the year 1936. Reproduction pound price has been included for the all-steel refrigerator car and a special allowance set up for high-tensile steel.

The per-pound prices of gondola cars built during the year 1936 compares favorably with the cost of hopper cars, and is materially in excess of the "All Others" types allowances. Therefore, it has been deemed advisable to eliminate the gondola car from the "All Other" column and combine it with the hopper car. To compensate for the removal of the gondola car from the "All Other" column and as the coke car and "All Other" types have been listed at the same price per pound (except for Class A), it is considered equitable to eliminate the "Coke Car" column from the rule and include the coke car in the "All Other" column.

Passenger-Car Rule 22

Changes in material prices in a number of items under this rule are recommended, based on quotations as of March 1 from the purchasing agents of the ten selected railroads, and indicate a general upward trend.

Items 1-A, 1-B and 1-C are modified, and note added, to clarify the intent that these allowances are based on ordinary flat type rubber belting, five-ply or less, used for car-lighting purposes, and do not apply to other types of belting such as may be required in connection with air conditioning, etc., the latter to be charged on the basis of storehouse cost.

Item 50 is modified to clarify the intent that service metal on steel-tired wheels should be charged and credited on the same basis as service metal on wrought-steel wheels.

It is the intent of the Committee to investigate labor and material costs again in October and if sufficient change develops, necessary revision will be made and inserted in the Rules effective January 1, 1938.

[The changes recommended in the existing rules are shown in detail in the report.—Editor.]

The report is signed by: A. E. Calkins (chairman), superintendent of equipment, New York Central; H. H. Harvey (vice-chairman), general car foreman, Chicago, Burlington & Quincy; F. J. Dodds, general car inspector, Atchison, Topeka & Santa

Fe; P. Kass, superintendent car department, Chicago, Rock Island & Pacific; O. A. Wallace, supervisor car repairs, Atlantic Coast Line; T. J. Boring, general foreman, M.C.B. Clearing House, Pennsylvania; J. P. Egan, superintendent car inspection and maintenance, New York, New Haven & Hartford; H. H. Boyd,

assistant chief motive power and rolling stock, Canadian Pacific; A. E. Smith, vice-president, Union Tank Car, and A. H. Gaebler, superintendent car department, General American Transportation.

(On motion the report was accepted.)

Report of Committee on Loading Rules

Changes in Loading Rules made to adapt rules to new types of shipments—Shippers' co-operation helps keep rules up to date



W. B. Moir
Chairman

New figures have been proposed for addition to the rules, as follows:

Fig. 32—To provide a method for securing entirely creosoted poles in flat and gondola cars.

Fig. 34—To provide a method for securing beam steel flooring on flat cars.

Fig. 34-A—To provide a method for securing steel box-car sides in gondola cars.

Fig. 74—To provide a method for securing wire mesh or bar mats on flat and gondola cars with high-tension bands.

Fig. 75—To provide an alternate method of securing wire mesh or bar-mats with hooked rods, wooden clamps and high-tension wire on flat cars.

Fig. 84-A—To provide a method of securing pipe loaded in pyramidal form with high-tension bands in gondola cars.

Fig. 108—To provide a method for securing galvanized corrugated pipe on flat cars.

The above seven new figures were added as a result of requests by shippers.

Revisions to Existing Figures

Important revisions were proposed to existing figures in the Loading Rules, as follows:

FIG. 26

Change specifications to read as follows:

Minimum Requirements for Securing Logs in Pyramidal Form—Flat or Gondola Cars

Item	No. of Pcs.	Description
A		Brake wheel clearance. See Fig. 2.
B	3 pr. per pile.	4 in. x 5 in., hardwood, or green saplings, 4 in. dia. at center. Must extend to $\frac{1}{2}$ the dia. of log. For logs longer than 20 ft. provide additional stakes spaced not more than 5 ft. apart. <i>Not required for gondola cars.</i>
C	2 per pile.	5 strands, $\frac{1}{8}$ -in. dia. wire, twisted taut, equally spaced and secured to stake pockets, flat cars, and stake pockets or side plates, gondola cars.

Not required when half the diameter or more of logs in top layer is below top of car sides.

Chains may be substituted. Logs 25 in. or over in diameter must be loaded in pyramidal form, with largest logs in bottom layer and with butts toward end of car. Alternate butts to equalize load.

See General Rules for further details.

Reason—To permit loading in gondola cars.

General Rules

RULE 5

Add new paragraph reading as follows:

"Lading in one or more pieces, in loose piles, or tied into units, placed lengthwise or crosswise in car, and leaving a total space across car in excess of 18 in., must be braced in such manner as will prevent toppling over, shifting or creeping side-wise."

Reason—To provide a safer method of loading.

FIG. 65

Eliminate last sentence of first paragraph, following Item G, reading: "Place rolls lengthwise."

Reason—A separate figure is being prepared covering Rolls. Change second paragraph, following Item G, to read:

"Pig iron, short billets, rolled material of small sectional area, castings, loose wheels, tires, etc., should be loaded in gondola cars without drop doors. When these or other similar materials (not otherwise specified) are loaded lengthwise or crosswise in one or more pieces, in loose piles or tied into units, leaving a total space across car in excess of 18 in., they must be braced in a manner that will prevent toppling over, shifting or creeping side-wise. Cars with drop doors must have door openings boarded over with material 2 in. thick, unless material is loaded so that it has no bearing on doors, or is interlaced in such manner as will not permit it to drop through door openings."

Reason—To provide a safer method of loading.

FIGS. 67, 68 AND 69

Reference to the type of tie wires in Fig. 67, Items B, D and E; Fig. 68, Items D and E and in Fig. 69, Items D and E were changed to read *6 strands 3 wrappings*. This change was made to strengthen the wiring.

FIG. 84

Changed to eliminate the substitution of high-tension bands, and to designate the location of base layer of pyramided portion of load.

Reason—New Fig. 84-A will make the use of high-tension bands on this figure unnecessary.

FIGS. 85, 86, 87

The headings of Figs. 85, 86 and 87 were changed to read "for securing wrought-iron pipe over 26 in. diameter" to conform to changes in other figures reducing maximum pipe diameters from 30 in. to 26 in.

FIG. 92

Change heading to read:

Minimum requirements for securing coated wrought-iron pipe—flat or gondola cars.

Reason—To permit loading in gondola cars.

FIG. 115

Eliminate last sentence of Item B, reading: "Not required when load is secured with sufficient $\frac{1}{8}$ -in. dia. wire ties to prevent material from shifting beyond car sides."

Add new paragraph at bottom reading as follows:

"Items B to G inclusive, may be substituted with 2 strands, 1 wrapping, $\frac{1}{8}$ -in. dia. wire, in cases where load extends 6 in. or less above top of car sides, or ends, or when pyramided from top of car sides to not more than 18 in. at center of car, provided load is covered with metal sheets, or similar material"

(minimum area 4 sq. ft.), wired down so as to prevent scrap from projecting beyond car sides or ends. Wire must be spaced not more than 3 ft. apart and secured to stake pockets or car sides."

Reason—To clarify the requirement.

FIG. 128

Change Item C, to read:

"8 in. wide, 10 in. high, 16 in. long, nailed to floor with 60-D nails, or use block and stakes per sketch 4. Metal blocking, per sketch 3, or of equal height and strength, secured with bolts, lag screws, or spikes ¼-in. dia. may be substituted for Items C, D, E and F."

Reason—To permit substituting sketch 4, for Items C, D, E and F, by request of shippers.

Add new paragraph to read:

Length of tanks to be determined from that portion resting on the floor. Diameter of tanks excludes rivets, welds, etc.

Reason—To provide uniformity in measuring.

FIG. 132

Add new paragraph to read:

"Length of tanks to be determined from that portion resting on the floor. Diameter of tanks excludes rivets, welds, etc."

Reason—To provide uniformity in measuring.

FIG. 133

Add new paragraph to Item B, reading:

"When width of load extends beyond flat-car floor, add one rod per pile to the number now specified for loads per sketches 1, 2, 4, 5, 6 and 8."

Reason—To create greater safety.

FIG. 159

Change Item F, to read:

"2 ea. machine.—Hardwood, 6 in. wide, long enough to extend beyond rotating portion. Thickness 2 in. less than distance between rotating portion and carriage. Secure to floor with one ¾-in. dia. bolt at each end with head countersunk."

Add new Item G, to read:

"2 ea. Item F.—2½-in. x 4-in. x 12-in., hardwood, driven between Items F and machine. Nail to Items F with 40-D nails."

Change paragraphs following new Item G, to read:

"Items F and G not required at center, unless machine has two-piece bed casting, nor at rear end of machine equipped with jacks."

"Pivoted machines equipped with jacks must have jacks screwed tight to prevent vertical motion of rotating portion."

"Jacks must not be used to apply Items F and G."

"All coal must be removed from bunkers. Water must be removed from boiler and reservoir."

"Boom end of crane must trail."

"Remove key or nut from center pin of trailing truck."

Reason—To prevent damage to machine equipped with two-piece bed castings.

FIGS. 166-168, 171, 176, 179 AND 180

The word "inflated" in the headings of these figures was changed to "pneumatic," as, for example "with wheels not having pneumatic tires . . ." This change was made to clarify the intent of the headings.

In addition, Item B in Fig. 180 was changed to read:

"10 in. high x 3 in. x 15 in., 2 each wheel, nailed to floor with 20-D, 40-D and 60-D nails, total of 8, each block. Substitute, if desired, for Items B and C, at front wheels, 2 strands, ½-in. dia. wire, twisted tant, or bands of equal strength. Attach to frame of machine and stake pockets, as per sketch 1."

Reason—To prevent damage to machine.

The report was signed by: W. B. Moir (chairman), chief car inspector, Pennsylvania; E. J. Robertson (vice-chairman), superintendent car department, Minneapolis, St. Paul & Sault

Ste. Marie; R. H. Dyer, general car inspector, Norfolk & Western; G. R. Lovejoy, master mechanic, Detroit Terminal; T. O. Sechrist, assistant superintendent machinery, Louisville & Nashville; C. J. Nelson, superintendent interchange, Chicago Car Interchange; H. S. Keppelman, superintendent car department, Reading; J. A. Deppe, assistant superintendent car department, Chicago, Milwaukee, St. Paul & Pacific; T. W. Carr, superintendent of rolling stock, Pittsburgh & Lake Erie and A. H. Keys, district master car builder, Baltimore & Ohio.

Comments By the Chairman

W. B. Moir (Pennsylvania): The following open dockets are receiving close attention and it is likely that all or most of them can be worked up in time for inclusion in the supplementary report to the annual report.

(1) The preparation and issuance of a circular which, if approved by the general committee, will be issued to members of the mechanical and transportation divisions calling attention to the importance of returning the experimental-load cars to the secretary for the benefit of the Sub-Committee. Also, a note to be added to present Interchange Rule 3 covering the experimental-load shipments, similar to the note now in the rule covering the handling of industrial cars.

(2) A revised table prepared combining the information now contained in Tables 1 to 9, covering the weight restrictions for loads on one car, overhanging one or both ends of car.

(3) New specifications and figure covering the loading of treated bridge timbers and lumber, having lengths more than 12 ft. on flat cars. Also, a revision of present Fig. 6 to improve the method of loading and bracing to prevent lumber from sliding off the cars.

(4) A new figure and specifications covering the loading of long poles as twin or triple shipments. Several of the larger pole shippers in the northwest are at present shipping experimentally, following a method proposed by George McCormick of the Southern Pacific.

(5) A notation to be placed on the girder rules to the effect that each girder shipped would be handled on its own merits. A revised Fig. 53 and 54 specifying when pivoted bolsters are to be used. A change in the present wording in Rule 9 to the effect that where steel diagonal braces are used in lieu of wood in the girder rules, wooden filler on the shoe of the diagonal brace will have to be used. A scale showing the size of the allotted hole required in connection with various size girders.

(6) A new figure and specifications to take care of round and dished head plates.

(7) A revision of present Fig. 43 which is obsolete and has not been used by the shippers for a number of years.

(8) A revision of present Figs. 46 and 47 which are inadequate to take care of the increased size of roof and airdome trusses being manufactured at present.

(9) A new figure and specifications covering the loading of wire mesh on flat cars, using high-tension wires as securing means. This is in addition to the high-tension band and clamp and rod figures contained in the previous report.

(10) A new figure and specifications covering the loading of small transformers.

(11) New figures and specifications covering the loading of tractors in line with experiments now being carried on from the plant of the International Harvester Company, Chicago.

(12) New figure and specifications covering the loading of rolls because rolls having been taken out of present Fig. 65 due to requirements being deemed inadequate.

(13) New specifications and figure covering an improved method of loading grindstones.

(14) New specifications and figure covering the loading of sawed and resawed stone with high-tension bands as securements, based on experimental tests now being conducted by a number of the stone shippers in the Indiana stone fields.

(15) New specifications and figure covering the loading of marble which at the present time is not covered in the rules.

Discussion

W. S. Guy (United States Steel Corp.): The steel corporation is interested in shipping material the proper way and always endeavors to carry out the rules as they are prescribed. We

have men who are very familiar and practical in connection with the loading of steel and they co-operate with the railroads in suggesting rules. We have a Loading Rules Committee and many of the rules that are on your books today are the result of the recommendations made by the Corporation Loading Committee, because of the fact that they thought that the rules suggested by us were good. The National Tube Company, a U. S. Steel subsidiary, is one of the largest pipe manufacturing companies in the United States, and Mr. Moir has referred particularly to pipe loading and we have been co-operating with them in an effort to carry out what the railroads thought was necessary for safety. For the past year or more, the activities of the A.A.R. Loading Rules Committee, in so far as the steel industry is concerned, have been centered on a revision of the existing pipe loading methods, in order to strengthen the securement, it being claimed that under modern transportation speeds and other conditions, pipe loads are a real hazard to the safety of the traveling public.

Representatives of pipe shippers met with the members of the Loading Rules Committee for round-table discussion of the various proposals time after time, correspondence was frequently exchanged and some yard switching tests conducted. New rules were finally drafted which will add thousands of dollars annually to the bracing expense of pipe shippers. Whether this additional expense is justified has yet to be demonstrated but all shippers agreed to go along with the demands of the carriers for increased protection.

In connection with rules pertaining to sheet-steel loading, new proposals are about to be adopted for crosswise loading in gondolas, and lengthwise and crosswise loading on flat cars. In the latter case the committee has only gone part way, as no provision has been made for tying sheet steel on flat cars with wire or bands. It is our present intention to conduct a test on this method immediately, and I want to inform the committee and the Association of this fact.

W. S. Messimer (N. Y. C.): Among the recommended revisions which are of interest is that of General Rule 5. An improperly or inadequately secured load in an open-top car presents a very great hazard, particularly when the load extends above the top of the car side, and though the degree of hazard is somewhat less with lower loads, it is of equal importance that they be as amply protected as the higher and more hazardous ones. The rules are very complete in their specifications for loading high cumbersome commodities, and, to a large extent, this is also true of lower loads, but frequently loosely

piled shipments, not extending above the side of car, are offered for movement without blocking or bracing, which apparently is considered unnecessary because the rules do not specifically require their use. The sides of the car will serve to prevent shifting of a load of this kind, provided it is evenly distributed and contacts the sides uniformly, but if not so loaded, shifting invariably results, causing uneven distribution of weight and often damage to the car and lading.

Present General Rule 5 requires that the weight of load be evenly distributed between the two sides of the car and between the trucks. This requirement specifies the manner of locating loads in cars at time of loading, but it does not necessarily infer that protection should be provided to insure that equal distribution of weight will be maintained as far as practicable while the shipment is in transit. The Committee's recommendation, that bracing be applied to prevent toppling over, shifting, or creeping sidewise when the total unoccupied space across the car is in excess of 18 in., appears to be a reasonable requirement and should prevent the weight from becoming unevenly distributed to an extent that operating difficulties or damage would result. It is noted that the essential parts of Rule 5, as amended, are also included in Fig. 65. This is a very desirable repetition, as the commodities specifically covered by this figure are those which most commonly give trouble from the causes previously described.

The committee has not as yet proposed any revision in the method of loading heavy steel rolls, but in its comments regarding Fig. 65, it infers that such action is being considered. Until a separate figure is prepared and adopted, it is presumed that Fig. 65 will continue to apply to loads of this type, notwithstanding that the last sentence of the first paragraph following Item G, referring to rolls, is to be eliminated. This figure now provides that the blocking and bracing be secured to the car floor with nails, but when the unusual weight of the larger mill rolls and their inherent tendency toward rolling is considered, it would seem desirable to secure the blocking and bracing with bolts, and thus reduce the possibility of failure of the means of securement.

The revision recommended in Fig. 115 is of particular interest due to the intense activity that has occurred in the scrap-iron market in recent months, during which most railroads have been frequently offered loads of scrap that did not comply with loading-rule requirements. The prevalence of this practice ultimately resulted in the issuance of Circular DV-890, calling the attention of the members to the necessity for strict enforcement



Latest Method of Electroplating—First Railroad Shop Installation of the Brush Method

of the provisions of Fig. 115. After the circular was issued, and its requirements insisted upon, various improvised, but inadequate, methods of loading were proposed as suitable substitutes for the approved method contained in the rules; all of which resulted in much confusion between shippers and railroads, and also between railroads interchanging such traffic. The revision proposed by the committee will be very helpful toward clarifying this situation, as it removes all doubt concerning the conditions under which loads of scrap may be accepted and moved.

Notice of the effective date of the revised figure, namely, June 1, 1937, was transmitted to the members in Circular DV-902, which also contained the statement that the revision supersedes all interpretations previously rendered by the Committee on Loading Rules. This statement further confirms the understanding that Fig. 115, as revised, will be the only authoritative basis for loading, accepting and handling scrap iron in open-top cars.

(Upon a motion, duly seconded, the report was accepted and the recommendations referred to letter ballot.)

Report of Committee on Tank Cars

Test installations of fusion-welded tanks extended—Longer intervals recommended between retests of certain classes of tanks



G. S. Goodwin
Chairman

During the year the committee considered a total of 371 dockets and applications for approval of designs, of which 253 covered shipping containers of the classes shown in the table below for application to new cars or for replacement on existing cars.

Seven applications covered 19 multi-unit tank cars to be used for the transportation of fifteen Class I. C. C.-106-A-500 one-ton containers each. Four applications covered new underframes and trucks for use in mounting 239 existing tank-car tanks. Five other applications covered 105 additional fusion-welded tank-car tanks for use in experimental service in the transportation of regulatory commodities: I.C.C.-103-BW (Fusion Welded Seams), 4 cars; I.C.C.-103-CW (Fusion Welded Seams), 1 car; I.C.C.-105-A-300-W (Fusion Welded Seams), 75 cars; I.C.C.-105-A-400-W (Fusion Welded Seams), 25 cars.

I.C.C.-103-B, 6 cars; I.C.C.-104, 1 car; I.C.C.-105-A-300, 2 cars; I.C.C.-105-A-500, 8 cars; A.A.R.-203, 260 cars; total, 824 cars.

Eleven applications were received for approval of tank appurtenances as follows: Two positive type outlet valves; and one each, combination safety disc and valve; center anchorage for existing cars; steam jacketed outlet nozzle; valve for I.C.C.-106-A-500 shipping containers; repairing worn threads of I.C.C.-106-A-500 shipping containers; modification in design of gaging device; proposed dome and discharge arrangement, Class I.C.C.-103 tanks; proposed dome and discharge arrangement, Class I.C.C.-103-B tanks.

Fusion-Welded Tanks

During the year the Interstate Commerce Commission authorized the construction and service of the following tanks fabricated by the fusion-welding method under its Docket No. 3666. The designs, construction and materials for these tanks have been approved by your committee: I.C.C.-103-BW, 4 tanks; I.C.C.-103-CW, 1 tank; I.C.C.-105-A-300-W, 150 tanks; I.C.C.-105-A-400-W, 100 tanks; total, 255 tanks.

In addition your committee has approved applications for designs, materials and construction of fusion welded tanks for the transportation of non-regulatory commodities, as follows: A.A.R.-203-W, 10 tanks; A.A.R.-203-W (chrome alloy lining), 10 tanks; A.A.R.-201-A-35-W, 35 tanks; total, 55 tanks.

Your committee at a recent meeting considered the following questions raised by the Director, Bureau of Service, Interstate Commerce Commission: "(1) Is the number of cars at present authorized and requested, reasonably sufficient to demonstrate the safety feature of fusion welded construction? (2) If not, what would be a reasonable limit to construction for experimental purposes? (3) What period of time do you consider necessary and sufficient for test purposes?"

In answer to these questions the committee presented a service record of the fusion-welded tanks placed in service to April 1, 1937, and recommended as follows:

"Periodic inspections of the tanks show them to be in good condition and it is the opinion of the A.A.R. Tank Car Committee that this experience with the specific commodities covered thereby is sufficient to justify the continuance of the policy of encouraging owners who wish to use tanks in accordance with fusion-welding specifications as recommended to the Interstate Commerce Commission in September, 1934. Experimental service to date indicates that fusion-welded tanks furnish the same degree of safety as riveted and forge-welded constructions. None of these fusion-welded tanks have been involved in any accident.

"The A.A.R. Tank Car Committee further recommends that fusion-welded tank-car tanks already authorized and subsequently authorized continue to be inspected as provided in the Special Order, I.C.C. Docket No. 3666, for a period of three years from date placed in service and periodic reports made of them. It is understood that the Committee on Tank Cars passes on all applications for tank cars and will also certify the fabricators of fusion-welded vessels as to their qualifications for fabricating tank cars of fusion-welded construction.

"It appears to be the duty of this committee to continue to

Classes of Shipping Containers Covered in 253 Dockets

Class	No. of Tanks
I.C.C.-103	4,609
I.C.C.-103-A	335
I.C.C.-103-B	30
I.C.C.-103-CW (Fusion Welded Seams)	1 ^a
I.C.C.-104	7
I.C.C.-104-A	51
I.C.C.-105-A-300	51
I.C.C.-105-A-300-W (Fusion Welded Seams)	61 ^b
I.C.C.-105-A-400	1
I.C.C.-105-A-400-W (Fusion Welded Seams)	100 ^c
I.C.C.-105-A-500	54
I.C.C.-105-A-500 modified	5 ^d
I.C.C.-106-A-500	1,610
A.A.R.-201-A-35-W	35
A.A.R.-203	25
A.A.R.-203-W (Fusion Welded Seams)	21
Total	6,996

^a One car authorized by I. C. C. for experimental service.

^b 125 Cars authorized by I. C. C. for experimental service.

^c 125 Cars authorized by I. C. C. for experimental service of which 25 cars were previously constructed.

^d Cars to have 10 in. of insulation and be equipped to transport liquid CO₂.

Ninety-one applications covered alterations in existing equipment consisting of: Anchorage changed from forge welded to riveted type; application of heater coils; conversion from A.R.A.-III to A.R.A.-III, insulated; A.R.A.-III to A.R.A.-III, rubber lined; A.R.A.-IV to A.R.A.-III, insulated; A.R.A.-IV to A.R.A.-III; I.C.C.-103 to A.A.R.-203 insulated; I.C.C.-103 to I.C.C.-103-B; I.C.C.-103 to I.C.C.-103, insulated; I.C.C.-103 to I.C.C.-103-B, insulated; I.C.C.-103-A to I.C.C.-103, insulated; I.C.C.-104 to I.C.C.-103; I.C.C.-104 to I.C.C.-103, insulated; 10,000 to 8,000 gal. capacity; 8,000 to 6,000 gal. capacity; 8,000 to 7,500 gal. capacity; single to three compartment; single to two compartment; dome, unloading and washout arrangements; renew section damaged by fire.

The classes and number of cars as altered were as follows: A.R.A.-III, 392 cars; I.C.C.-103, 153 cars; I.C.C.-103-A, 2 cars;

examine proposals for fusion-welded tank cars for other commodities if, when and as submitted, and proceed thereafter as required."

Laminated Sheets in The Fabrication of Tank Cars

A small number of railroad car tanks have been constructed for the transportation of certain commodities using nickel-clad steel. Consideration is also being given to using sheets clad with stainless steel and other protective metallic coatings. In order that these coatings of non-corrosive materials may be entirely effective in protecting the commodities transported, it becomes necessary in such tanks, to calk weld the inside seams in order to cover the exposed carbon steel. In this calk welding, rods of the material used to clad the steel are used so that the entire interior of the tank presents only a surface coated with the non-corrosive metal used to resist the undesirable action on the base metal of the commodity transported.

The tank car specifications of the Interstate Commerce Commission prohibit the practice of calk welding for riveted car tanks. The main problem presented by such calk welding is the effect of the welding on the adjacent steel plate, which, in a riveted vessel, cannot be stress relieved.

The committee has arranged for tests to demonstrate the effect of calk welding on cars having nickel or stainless-steel cladding.

Retests of Tanks and Safety Valves of I. C. C. 104-A And 105-A Cars

Following the procedure as laid down in Section D of the "Regulations for the Transportation by Rail of Explosives and Other Dangerous Articles in Freight, Express and Baggage Services," proposals were made by the American Petroleum Institute for changes in the I.C.C. Shipping Container Specifications to amend Par. 19 of Spec. 104-A to provide that tanks and safety valves must be retested at intervals of five years or less after the original test, instead of two years or less as now required.

The vapor pressure, lb. per sq. in. (gage), of liquefied petroleum gas shipped in I.C.C. 104-A cars, is approximately as follows: 1 at 10 deg. F., 8 at 32 deg. F., 24 at 60 deg. F., 38 at 80 deg. F., 62 at 105 deg. F. The loading temperature varies from 30 deg. F. to 70 deg. F., the average being 55 deg. F.

On Class I.C.C. 104-A cars, the regulations require that the name of the commodity be stencilled on the jacket; therefore, this stencilling restricts the lading which can be transported in these tanks. See sub-par. 431 (a) of the I.C.C. Regulations.

Class I.C.C. 104-A tanks are of riveted construction, similar to Class I.C.C. 103 tanks with the exception that the former are of heavier construction and tested to 100 lb. pressure instead of 60 lb. pressure for the I.C.C. 103 tanks.

Inasmuch as tanks and safety valves of Class I.C.C. 103 must be retested within ten years after original tests and thereafter at intervals of five years or less, there should be no reason why the retests periods on Class I.C.C. 104-A tanks and safety valves could not be made every five years instead of every two years as at present required. From a safety standpoint this change in the retest periods should involve no additional hazard for these tanks are shipped under pressure and should leakage develop, the car would not be accepted for transportation.

This type of equipment has been used for the transportation of liquefied petroleum gas for nine years and, based on the experience in operating them, it is felt that it is not necessary to make these tests at such frequent intervals. Incidentally, the extension of these retest periods will result in a considerable saving to the railroads in empty mileage as cars must, in many cases, move long distances to shops equipped to make the tests. This frequent testing also involves a great expense to the car owners as it is necessary to remove all the fittings and thoroughly dry out the inside of tank after each test which is not only a costly operation but withdraws the car from service for nearly 30 days.

It is felt that inasmuch as retest periods on tanks of higher pressure such as I. C. C. 106-A-800 and I. C. C. 107-A * * * are required at intervals of every five years, the same retest periods should apply for all tests on Class I. C. C. 104-A tanks.

A. A. R. Rule 3, Sec. (t) para. (11) reads as follows: "Tank cars, the safety valves or tanks of which are due for test within 30 days, will not be received from owners." In view of this A. A. R. Rule, it is now necessary to test I. C. C. 104-A tanks at intervals of one year and eleven months.

Amend Par. 14 of Spec. 105-A-300 as follows: Change sentence in this paragraph reading "All tests must be made at intervals of two years or less," to read: All tests must be made at intervals of two years or less *except for tanks used exclusively for "liquefied petroleum gas" on which all tests must be made at intervals of five years or less.*

The above change will also apply to I. C. C. 105-A-400, I. C. C. 105-A-500, and I. C. C. 105-A-600 tanks used only for the transportation of liquefied petroleum gas.

The vapor pressure, lb. per sq. in. (gage), of liquefied petroleum gas shipped in I. C. C. 105-A series cars, is approximately as follows: 32 at 10 deg. F., 58 at 32 deg. F., 98 at 60 deg. F., 134 at 80 deg. F., 192 at 105 deg. F. The loading temperature varies from 30 deg. F. to 70 deg. F., the average being 55 deg. F.

On Class I. C. C. 105-A series cars the regulations require that the name of the commodity be stencilled on the jacket; therefore, this stencilling restricts the lading which can be transported in these tanks. See sub-paragraph 431 (a) of the I. C. C. Regulation.

From a safety standpoint it is felt that inasmuch as retest periods on tanks of higher pressures such as I. C. C. 106-A-800 and 107-A * * * are required at intervals of every five years, the same retest periods should apply for all tests on Class I. C. C. 105-A series tanks and no additional hazard would be involved.

These proposals have been unanimously approved by your committee and recommendation transmitted to the Bureau of Service, Interstate Commerce Commission for their adoption.

Conversion of Ammonia Tank Cars to Chlorine Service

Question was raised recently as to the propriety of converting tank cars from ammonia service to chlorine service or to the transportation of any compressed gas other than that for which the car was originally constructed.

After careful consideration the following revision of Par. 431 (a), as shown in Supplement No. 9 to Agent B. W. Dunn's Freight Tariff No. 2, publishing I. C. C. Regulations, was approved and submitted to the Bureau of Explosives for inclusion in the Bureau's next conference docket:

"Before a tank car may be used for the transportation of any compressed gas other than that for which it was *originally constructed*, as indicated by the name of the commodity stencilled on the tank, the owner of the car, or party authorized by the owner, must *secure approval* to change the stencilled name, and the manhole closure, safety valve, and induction and eduction valves and pipes, as necessary to make the car suitable for the new service, and stencil date of changes and initials of owner, or party making these changes, under commodity stencil on tank. All changes must be certified to the Bureau of Explosives."

The last revision of the specifications for tank cars was made in March, 1931, and a supplement was issued in April, 1936.

In order to consolidate, bring up to date, and add to these specifications, they are now being revised, and in revising them all questions pertaining thereto are being considered and specifications for other types of tanks added.

Your Sub-Committee expects to complete all revisions of these specifications and have them in shape this Summer, so that they can be acted upon by the full Tank Car Committee early in the Fall.

This part of the report was signed by F. A. Isaacson, chairman, W. C. Lindner, H. J. Gronemeyer, J. J. Root, R. W. Thompson, V. Willoughby, M. C. Blest, W. C. Cooper.

Definitions and Designating Letters for Tank Cars

The committee during the year considered request for designating letters and definition for a special type of flat car to transport demountable milk tanks and after careful consideration recommends the adoption of the following:

"TMN"—A car of special design with attachments to carry

containers for the transportation of non-regulatory commodities.

Specifications For Class A. A. R. 201-A-35 Tank Cars

It is recommended that par. 6 (c), Class A. A. R. 201-A-35 Tank Car Specifications be revised as follows:

Proposed Form—The manner in which tank is supported on and securely attached to the car structure must be approved and in accordance with paragraphs A.A.R.-6 (a), (b) and (c) Specification Class I.C.C.-103. The shearing and bearing values of anchorage rivets and the bearing value of anchorage plates and shell plates at the anchorage shall be proportioned to the relative shearing and bearing value of the aluminum alloys used and the shearing and bearing values of the steel specified in paragraph A.A.R.-3 (a) Specification Class I.C.C.-103. The shearing and bearing value of aluminum alloys are as follows:

Aluminum Alloys	Min. shear- ing strength, lb. per sq. inch	Min. ultimate bearing value, lb. per sq. inch
2S½H	10,000	28,000
3S (as rolled)	10,000	28,000
3S¼H	10,000	28,000
3S½H	13,000	36,000
51SW	20,000	54,000
17ST	33,000 (Rivets only)	99,000

It is recommended that par. 8, Class A. A. R. 201-A-35 Tank Car Specifications, be revised as follows:

Proposed Form—Calking. All seams, including those formed by attachment of expansion dome and other external projections, must be calked both inside and outside, except that inside calking of the seam formed by attachment of expansion dome to tank is not required and outside calking of seams formed by attachment of all external projections, except the expansion dome, is not required. Split calking prohibited. *Calk welding may be used provided the weld bead is preferably ⅛ in. but not more than ⅜ in. in the joint, thus preventing the metal from being overheated.*

Letter Ballot Items

It is recommended that the following items contained in this report be submitted to letter ballot of the members: Definitions and designating letters for special type cars to carry containers for the transportation of non-regulatory commodities; revision of Specifications for Class A.A.R. 201-A-35 Tank Cars.

The report is signed by G. S. Goodwin, (chairman), assistant to general superintendent motive power, Chicago, Rock Island & Pacific; F. A. Isaacson, (vice-chairman), engineer car construction, Atchison, Topeka and Santa Fe; A. G. Trumbull, chief mechanical engineer, Chesapeake and Ohio; G. McCormick, general superintendent, motive power, Southern Pacific; W. C. Lindner, chief car inspector, Pennsylvania; A. E. Smith, vice-president, Union Tank Car Company; G. A. Young, head, School of Mechanical Engineering, Purdue University; F. Zeleny, engineer of tests, Chicago, Burlington and Quincy; W. C. Steffa, transportation manager, Sinclair Refining Company; R. T. Baldwin, secretary, The Chlorine Institute, Inc.; H. J. Gronemeyer, supervisor car equipment, E. I. duPont de Nemours & Co., Inc.; R. W. Thomas, manager, Philgas Department, Phillips Petroleum Company, Detroit, Mich.

Discussion

V. Willoughby (American Car & Foundry Company): The report of the Tank Car Committee shows that the committee has been striving to keep in step with industrial development, both in container and car construction, meeting increasing needs for especially-designed equipment for commodities new to bulk transportation, and yet have adhered rigidly to their established principles of safety.

Industry is asking for bulk transportation of many new commodities. It is also furnishing new materials and methods of fabrication and this committee is to be congratulated on the whole-heartedness in which it has and is meeting and solving, from the transportation angle, the many problems presented.

(Upon motion, duly seconded, the report was approved and referred to letter ballot.)

Report on the Lubrication of Cars



G. W. Ditmore
Chairman

During the past year your committee, by invitation visited the plants and laboratories of the Shell Petroleum Co. at Roxanna, Ill.; the National Bearings Metal Company, St. Louis, Mo.; and the Railway Service and Supply Corporation, Indianapolis, Ind.; where instructive demonstrations were made in the interest of improved car journal performance.

The suggestion made in 1934 that members of the General Committee undertake tests on their roads of various types of lubricators and lubricating methods is being followed.

Trial applications have been made of the following: Sperry pads, Staypax pads, Wicktype lubricators, Miller journal box lubricators, Ditmore pads, Spring pad lubricators (Sou. Pac.), Keyoke (Kendall) lubricators, Bag packing, Hennessey lubricators, Isothermos journal box and lubricators, Disc Flo lubricators.

The tests have necessarily been of limited proportions and so far the results have not shown any developments that produce better general performance than that obtained by the use of the standard waste and oil packing. Tests are still being continued with some of these devices without any conclusive results to date.

Manufacturers of lubricating devices which require changes in the construction from the present standard journal boxes, bearing, and wedges, are continuing research and tests with these devices and the possibilities for their successful operation are being followed by this committee with considerable interest.

It is recommended that intensive experimental work should be initiated to encourage progress along these lines in addition to the numerous trial devices undergoing tests.

Your committee has repeatedly called attention to the necessity for member roads to follow the requirements of A. A. R. recommendations and Interchange Rule 66.

The rule provides "No charge shall be made for repacking, etc., unless all boxes are repacked and the work in all details, has been performed, or if oil and waste used does not meet the A. A. R. specifications in all details."

Many car owners continue to repack foreign cars with new materials in order to justify billing charges, and use materials inferior to the A. A. R. Standards in owned cars. This practice is not in the best interests of transportation and is unfair to the member roads that observe the spirit of the rules. Cars are handled in interchange and where the journal boxes are improperly packed or packed with inferior materials and the cars stencilled in date, the handling line is penalized where hot boxes develop.

In an effort to correct such practices, it has been recommended in the past that an addition to Interchange Rule 3 make it a requirement that "All cars in interchange must have journal boxes packed and cars stencilled in accordance with the requirements of present Rule 66 and the materials used must meet the requirements of the A. A. R. Standards."

This recommendation has been approved by the Arbitration Committee and will be recommended by that committee in its annual report.

In order to justify removal of journal bearings that should not be continued in service your committee recommends the addition of a new item (7) to Section (j) of Interchange Rule 66 to read: "Journal bearings shall be considered as requiring renewal when lug extension is damaged or worn to

the minimum of dimension C for relined journal bearings A. A. R. Manual, Section A. Specification M-502-32."

The dimensions referred to are:

Size, In.	New, In.	Limit for Relining, In.
4 1/4 x 8.....	4 3/4.....	4 3/4
5 x 9.....	5 1/2.....	5 1/2
5 1/2 x 10.....	6.....	6
6 x 11.....	7.....	7

A request from a member railroad that journal bearings with dimensions the same as A. A. R. Standards but with lining metal of a special mixture known at Satco in place of the A. A. R. babbitt lining, be considered as a permissible alternate in interchange, was considered. It is recommended that the request be granted and that journal bearings lined with "Satco" metal be considered as suitable alternate to the standard babbitt lining, in interchange. This recommendation is concurred in by the Committee on Specifications for Materials.

Your joint sub-committee has held three (3) meetings during the year. At the first meeting, held at Chicago on Thursday, June 25, 1936, it was decided that the first work of the joint sub-committee would be to make a study of reclaimed journal-box lubricating materials, viz., oils, wastes and packings. As a basis for the study, the chairman was authorized to request representative samples of reclaimed oil, renovated wastes (freight and passenger) and packings made from renovated materials (freight and passenger) from each member of the A. A. R. Committees (Specification and Lubrication), plus corresponding samples from the Southern Pacific and the Canadian Pacific. A circular letter addressed to the 17 railroads represented was issued under date of July 22, 1936, wherein the desired samples and answers to a questionnaire were requested. Each road was requested to send duplicate samples to each of the three members of the joint sub-committee. To date the samples and information requested have been received by each of the three members of the joint sub-committee from the following roads: Atchison, Topeka & Santa Fe, Baltimore & Ohio, Chesapeake & Ohio, Chicago, Burlington & Quincy, Chicago, Milwaukee, St. Paul & Pacific, Chicago & North Western, Chicago, Rock Island & Pacific, Delaware & Hudson, Illinois Central, Missouri Pacific, New York Central, New York, New Haven & Hartford, Northern Pacific, Pennsylvania, Southern Pacific, Southern.

The second meeting was held at Indianapolis, Ind., on August 26, 1936, to give the joint sub-committee an opportunity to observe the laboratory facilities at the plant of the Railway Service and Supply Corporation and to familiarize them with the work in progress there covering researches in car-journal lubrication, particularly the work in progress for the New York Central, Pennsylvania and Pullman Company.

Procedure for investigating the samples of reclaimed oils and wastes by each member of the joint sub-committee was adopted, and it was decided that analyses be made of the duplicate samples independently by the three laboratories and the results then brought together for comparison and use as a basis for possible specification modification. In the absence of any A. A. R. or A. S. T. M. methods or procedure for the analysis of journal-box packing, it was decided that the joint sub-committee attempt to develop apparatus and methods covering this item, having in mind keeping within the possibilities of the laboratory facilities and technical personnel of the average railroad.

A sub sub-committee consisting of Chief Chemists Geiser (N. Y. C.), Mathewson (A. T. & S. F.) and Reamon (Mo. P.) met at the laboratory of the Railway Service and Supply Corporation, Indianapolis, on Dec. 6, 1936, for the purpose of experimenting with a trial apparatus developed for the joint sub-committee by the Cincinnati Scientific Co. This experimental apparatus was not entirely satisfactory, and, therefore, the sub sub-committee did not approve it and could not work out a standard procedure.

The third meeting of your joint sub-committee was held at Indianapolis, Indiana, during the afternoon of March 9, concurrently with the meeting of the Lubrication Committee held there on March 9 and 10, 1937.

The second experimental apparatus being developed by the sub-committee was tried out. Means for mechanical washing were added to the flushing and rinsing by solvent which had been found insufficient for the purpose in the first apparatus. After observing the apparatus and discussing the matter, it was concluded that the second experimental apparatus had possibilities, but that further experimentation and check of results would

have to be carried out before final recommendation could be made.

Owing to the time required to assemble the samples, develop apparatus, standardize procedure and check results, the work of your joint sub-committee covering reclaimed materials will not be sufficiently complete to draw conclusions and make recommendations for report to the Association at this year's annual meeting. It is felt, however, that progress has been made and that the investigations now under way will, when completed, serve as a basis for definite recommendations covering reclaimed journal-box lubricating materials.

While your joint sub-committee has not undertaken any investigation of new car oils, wastes or packings during the year, they have kept in close touch with an extensive test program now in progress. This work was undertaken to study the causes of lubrication troubles and to compare and evaluate new car oils in connection with different types of waste and bearings.

As a result of these researches, a specification for an all-year car oil has been developed and oil to these specifications is being tried out in service, the results of which are being followed by your sub-committee.

The sub-committee report was signed by J. R. Jackson, chairman; E. L. Johnson and E. E. Chapman.

In view of the need for more effective dust guards and journal box lids to improve the protection of journal lubrication from snow, water, dirt and other contaminations, a questionnaire was prepared for the purpose of developing information concerning types of guards and lids now in use or in test service. The questionnaire was sent by the Secretary to car and locomotive voting members and private car owners.

A review of the 228 replies definitely indicates that the present A. A. R. standards are not adequately providing for a seal-proof journal box and that there is a real need for substantial improvement. A number of suggestions for betterments have been received but time has not permitted a thorough analysis of all the information presented.

The subject will require much further study and research and your committee proposes to analyze carefully all the data accumulated with the view of being able to submit definite recommendations in next year's report.

It is suggested that member roads in the meantime experiment with various methods of sealing journal boxes for the purpose of assisting your committee in its efforts to develop improved protection for journal lubrication.

The sub-committee report was signed by E. L. Johnson, chairman; C. Dierks and E. E. Von Bergen.

In addition to using lubricating materials of approved grade and quality, the recommended methods of application of packing to the journal boxes, viz., 1 in. below the center line of the journal and binding the packing in one mass, should be more carefully practiced. The great number of overpacked boxes with resultant danger of waste grabs and hot boxes indicate the need for greater attention.

Your committee wishes to stress the fact that it is equally important to insist upon careful attention of the journal box and its related parts, if better lubricating performances are to be attained. Care should be exercised in the handling and examining of journal bearings and wedges to insure the application of such parts only when in good condition.

It is also desired to direct attention to the practices outlined in the A. A. R. Wheel and Axle Manual for machining axles and finishing journals, centering journals, and mounting wheels centrally. Investigation of wheels and axles in service indicates that a large proportion of hot-box trouble originates in failure to use proper care in the wheel shops.

The report was signed by: G. W. Dittmore (chairman), master car builder, Delaware & Hudson; P. Maddox, superintendent car department, Chesapeake & Ohio; E. Von Bergen, general air brake, lubricating and car heating engineer, Illinois Central; H. P. Allstrand, principal assistant superintendent motive power and machinery, Chicago & North Western; E. L. Johnson, engineer of tests, New York Central, and J. R. Jackson, engineer of tests, Missouri Pacific.

Discussion

C. B. Smith (B. & M.): Special studies on journal box performance and causes of hot boxes were made for a period of over a year and assembled data covering two to three years

performance. As a result of these studies, I am convinced of the following:

First.—With the present journal bearing set-up and utilizing oil-soaked waste packing as the lubricating medium, and with the best of care and attention on the part of trained workmen, hot boxes can not be avoided under the prevailing system of handling cars.

Second.—The hot box occurrences can be minimized by the untiring vigilance of maintenance forces on inspections and servicing of journal boxes, there being sufficient force to cover all cars in all trains.

Third.—The handling of cars in terminals requires many switching, humping and transfer movements. It is realized that transportation requires as quick work as possible, but it is undeniable that such operations with car impacts exceeding four to five miles per hour, or a succession of impacts displaces waste packing, which must be reworked and inspections properly made before trains depart.

Fourth.—After the best of attention favorable to the packing there still may exist hidden defects in bearing lining, or a wiper, or small waste grab, which has no visible tell-tale that the oiler can see, to cause heating after the train has started.

Fifth.—The fact that all unfavorable conditions do not always cause hot boxes promotes a practice of "taking a chance" without providing for inspection and proper servicing of all boxes if there is not time enough.

Sixth.—Journal boxes, even when properly serviced before leaving a terminal, will sometimes develop one hot box—often a waste grab. In such cases defects were either hidden or occurred after train started.

J. McMullen (Erie): The greatest cause of hot boxes is to waste grabs. One thing we need is a means of preventing the packing from rolling in the journal boxes.

About two years ago we welded a strip of steel inside of the journal box longitudinally with the journal and 1 inch below the center line, keeping this strip about $\frac{5}{8}$ inch away from the journal and about $\frac{3}{4}$ inch away from the collar and back fillet to provide for lateral. This prevents the dope from rolling in the boxes and in addition to this it is impossible to pack the box too high. We equipped four coal cars, one coach and one caboose and the results have been very satisfactory.

K. F. Nystrom (C. M. St. P. & P.): In connection with the lubricating committee's report, it is very gratifying to see the tests and advances made, and I would like to make a suggestion in connection with the recommendation that a new cause for scrapping bearings be inserted in Sec. (j) of Rule 66. If it is desired to adopt any such new cause for scrapping bearings, I believe it should read: "When damaged or worn below the minimum of dimension C," because the manual now allows relining of bearings when worn to this minimum. I simply cite this to avoid any possible conflict with the manual.

Furthermore, if any new condemning limit of this kind is to be inserted in the rule, we must remember that it is for the guidance of the inspectors and repairmen, and I hope the Arbitration Committee will decide to insert a sketch in the rule book showing a cut of the brass and just where this dimension is to be taken for the different sizes, because these men in the field do not have a copy of the manual.

In connection with oil, we do not today have a satisfactory lubricating oil. It is a compromise of summer and winter oil. I never was in accord when we changed the period from 12 to 15 months. In northern climates we have severe winters and hot summers and I believe we would be better off if we had an annual period instead of so many months.

Mr. Smith made a remark that hot boxes are rare. I wish that some of us could say that. I just looked up our report and they still for the year hang around four figures. As far as some of us are concerned, there is no rarity about it.

It is gratifying to note that the Lubricating Committee is trying to improve the design of the journal box. I believe that there is some conflict in efforts between the Lubricating Committee and the Car Construction Committee. I believe that a joint committee of the two should work close together.

I am inclined to believe that the time soon will come when the journal box, which has served us so well for three-quarters of a century, will become obsolete. I believe that a study of the situation today would indicate that a new box could be designed, perhaps suggested by European practice.

I also believe that the time is almost ripe when we could design a standard box for roller bearings. As I understand it, all the patents covering roller bearings of various makes have expired. I can see where a composite design can be made to take care of any bearing and be an improvement. In connection with the journal box we stress the tight lid and tight back of the box, which is very important. There is one element which is seldom discussed in connection with hot boxes, and that is, how the water enters into the box. We all assume, particularly in the wintertime, that it comes from snow melting, but I have come to the conclusion that there are other sources.

Probably the Milwaukee is one of the largest users of roller bearings, and our principal trouble, in fact practically the only trouble with roller bearings, is that water enters the boxes in extremely cold weather. We have had cases where we have had over 50 per cent of water in the boxes, which had absolutely tight lids and openings in the back as tight as we can make them. I suspect that this continual condensation of water in the boxes is due to the heating by friction of the internal surfaces of the box, especially in high-speed train operation in cold weather, when the surfaces are rapidly cooled, and a frost forms and melts almost constantly. I believe that the committee should give that some concentration the coming year.

Mr. Ditmore: We will be very glad to make that correction, in accordance with Mr. Nystrom's suggestion. The other suggestion made by Mr. Nystrom will be given due consideration in the report to be made later.

W. E. Dunham (C. & N. W.): We have carefully reviewed the report of the Committee on Lubrication of Cars and Locomotives as covering cars in Circular D. V.-905.

It would seem that tests of the various types of lubricators and methods of lubrication begun in 1934 should at this time have developed some facts to indicate whether such lubricators and methods had merit and were worthy of more intensive experimentation. One of the listed lubricators is being used extensively on a large assignment of coaches in regular suburban service, and another is giving a good report of itself in fast passenger service. No doubt others are giving equally good results.

The membership should be advised as to these actual installations and results as they are developing, both for individual road information and as a matter of record for the division.

As to the proposed change in Rule 66 to require all journal boxes under cars in interchange being packed in accordance with the requirements of present Rule 66, and materials used meeting the requirements of the A.A.R. Standards, such a plan is extremely desirable, but equally extremely impractical and impossible of policing.

Furthermore, there are many railroads using a reclaimed oil that gives excellent results in lubricating, but because it is only slightly "off" in some of the requirements of Specification M-904-36 they prefer to follow the practice criticised by the committee and use only new oil and new waste when repacking foreign cars and charging for that work. Many foreign car boxes are packed the same as the "home" cars with this satisfactory journal packing and good performance results.

In view of the fact that the specifications for reclaimed oil, M-904-36, is still open to criticism, and that the all-year oil has not demonstrated its general practicability as is noted in the committee's report, we would suggest that the proposed change in Rule 3, Item (7), Sec. (J) be withheld and the particularly vicious cases of using "inferior" materials on owned cars be directly checked and corrected, if necessary by the field inspectors under the jurisdiction of the Mechanical Division.

The final report on the subject of journal lubrication materials, as referred to by the committee, should be available before taking this action on the interchange rules.

On the dual subject of dust guards and journal box lids, the generally good results with the present standard lid, particularly the lip construction and the ground faces on the boxes, excepting, of course, in the "dust bowl" areas, would seem to indicate that the lid can be expected to continue to give a good performance.

On the other hand, the dust guard is a detail that should and must be given intensive study. The present standard is not satisfactory, particularly with modern operating conditions. It can and should be improved. The committee should give preference attention to this detail.

(A motion to accept the report was seconded and carried.)

(The meeting then adjourned.)

Sorensen and Mann Elected

Long service to division recognized in selection of chairman and vice-chairman



A. L. Sorensen, Chairman-Elect

AS a result of elections held yesterday at Atlantic City, immediately prior to the adjournment of its annual meeting, the Purchases and Stores Division, A.A.R., unanimously adopted the report of the nominating committee, electing for the chairmanship of the Division, A. L. Sorensen, stores manager of the Erie, and for the office of vice-chairman of the Division, A. C. Mann, vice-president, purchases and stores, Illinois Central.

A. L. Sorensen

In electing A. L. Sorensen chairman, the Purchases and Stores Division, Association of American Railroads,



A. C. Mann
Vice-Chairman-Elect

selected a man who has not only won recognition by many years of unusually active though quiet plugging in and for the association, but whose qualifications for the office have been recognized for a long period. The appoint-

ment might easily have been made before, but it was only a matter of time.

The new chairman is a railway supply officer with an unusual background. He was born in Copenhagen, Denmark, in 1885, and saw railway service as early as 1900 when he entered the employ of the Erie. After five years of clerking on the Erie, he began "serving time" as a warehouse man with the American Steel & Wire Company, and was successively promoted to office manager, credit man and assistant cashier. During this period, he studied at and was graduated from the New York University School of Commerce. He also engaged in private practice as a public accountant and was an instructor of accounting at the New York University. He returned to the Erie in 1908 as a special investigator under the comptroller, and was advanced to Statistician, to chief clerk, to special accountant, to general auditor and to comptroller, and in 1921 was appointed to his present position of manager of stores. During his administration, the Erie stores methods have been extensively mechanized. Measured by the usual standards of comparison, the inventory showing, far below the average, has been maintained, and a manual of stores practices and instructions was evolved, which has interested roads in this and other countries.

Mr. Sorensen has been especially active in the Division studies of stores expense, statistical comparisons and in representing the Division in its relations with the Accounting Officers' Association and the Bureau of Railway Economics. He has also served on the annual contest committee, on the nominating committee and committees in charge of selecting the subjects and personnel of the committee, and has been a member of the general committee since 1931. He has been chairman of the eastern stores group and has served on committees as-

signed to study the reports of the federal co-ordinator. He addressed both the New England Railroad Club at Boston and the Central Railroad Club at Buffalo during the past year.

Albert C. Mann

Albert C. Mann's election to vice-chairman is also recognition of active service in the Division over several years, and his characteristic ability for leadership which was especially well displayed in the days of the codes. He was born in Effingham, Ill., September 1, 1881, and entered railway service in 1900. He served until 1912 in various clerical positions in the traffic and purchasing departments until 1912, when he was promoted to assistant purchasing agent. Three months later he was appointed purchasing agent of the Central of Georgia and in the following year was appointed purchasing agent of the Illinois Central. He was a member of the Regional Purchasing Committee of the Southern Region in the United States Railroad Administration in 1918, and during 1919 was vice-president of the International Steel Corporation, New York.

Mr. Mann returned to railroad service in 1920 as vice-president in charge of purchases of the Illinois Central System and the Central of Georgia and has continued in charge of the purchasing and stores of the Illinois Central since then. He has been a member of the Purchases and Stores Division for several years and served on various committees organized by the Division and the Railway Executives' Association, to study problems growing out of the creation and administration of the NRA codes, and has continued in related work for the Division and the railroads, principally as chairman of the special purchasing committee of the Division. It is an unusual coincidence, and perhaps somewhat significant, that he was elected to the vice-chairmanship of the Division in

the same hall where W. Davidson, the late general storekeeper of the Illinois Central, conducted the Division's meetings as chairman in 1930, when the Division last met in Atlantic City.

Final Registration Figures

The total registration at the close of the convention on Wednesday morning, compared with similar figures for recent conventions, is given in the following table. In the rush of registration some of those who are classed as railroad guests should have been included as members of the Mechanical Division. This would somewhat increase the enrollment for the Mechanical Division, but would reduce the number of railroad guests. On the other hand, many railroad representatives were admitted to the pier on Saturday and Sunday by showing their passes, who in previous years would have been registered as railroad guests, so that this number is considerably lower than it should be. In considering the attendance at the conventions and exhibit, the fact should not be overlooked that 5,443 people visited the exhibit on Saturday and Sunday who were not registered, entrance being gained by the showing of return trip railroad tickets, or railroad passes.

	1922	1924	1926	1928	1930	1937
Mechanical, Division V.....	1,008	1,223	1,405	1,572	1,595	1,469
Purchases and Stores, Div. VI.	384	434	480	494	541	366
Motor Transport, Div. VIII...	.....	.....	.....	56	71	.....
Railroad guests .....	.....	.....	.....	706	834	816
Railroad ladies	1,036	1,201	1,198	1,397	1,229	1,031
Supply men	2,304	2,670	3,135	2,647	2,536	2,700
Supply ladies	575	676	725	754	602	552
Special guests	947	1,111	901	38	168	78
Complimentary .....	.....	.....	.....	239	*	.....
Total	6,254	7,315	7,844	7,903	7,576	7,012

* Complimentary registrations included in railroad guests.

* * * * *

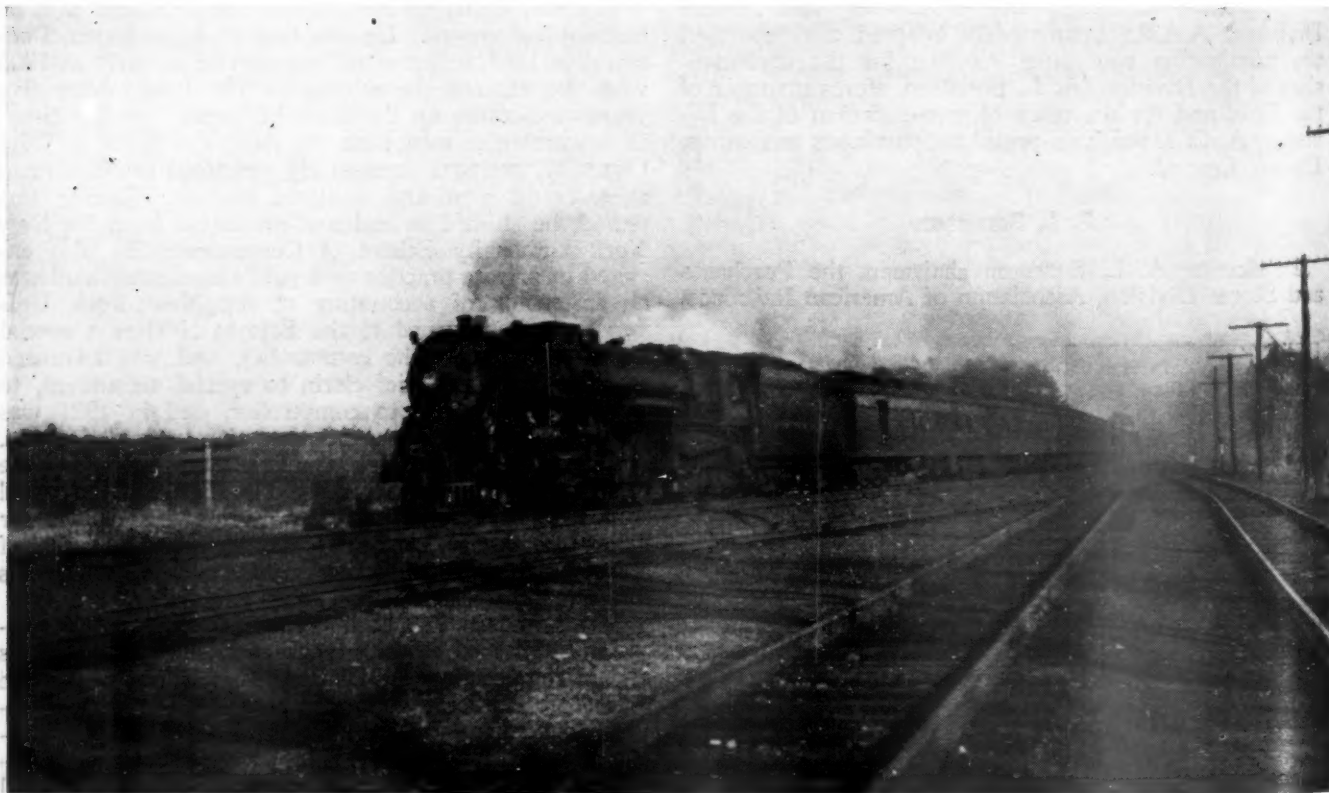


Photo by C. Parker

The Boston Section of the "Twentieth Century Limited," Westbound on the Boston & Albany, near Westboro, Mass.

Purchases and Stores Division Closes Annual Meeting

Debate price books and talk standards. Hear R. B. A. president and elect Sorensen chairman in third day's session

ON Wednesday, the Purchases and Stores Division, A. A. R., held the third and concluding session of its convention in Atlantic City by devoting the day to the presentation and consideration of reports on stationery and printing, fire prevention, facilities for and expense of material handling in stores, simplification and standardization of stores stocks, exchanging surplus material, and material guarantees.

Chief interest centered in a debate over the controversial subject of stock books and stock cards in stores work and in extended remarks made by Harry A. Wheeler, president of the Railway Business Association, who addressed the convention on the danger of government ownership and the work which is being done by the railroads and the supply industry to prevent it.

Responsive to an invitation from the chair, F. C. Fechtig, purchasing agent of the Atlantic Coast Line, who has the distinction of having the longest service record as a railway purchasing agent, also addressed the meeting.

Elections held at the conclusion of the convention resulted in the selection of A. L. Sorensen, stores manager of the Erie, for the chairmanship, and A. C. Mann, general purchasing agent, Illinois Central, for the vice-chairmanship. Elections to the General Committee for two years consisted of J. M. Betterton, general purchasing agent, Southern Pacific, Pacific System; J. C. Kirk, assistant general storekeeper, Chicago, Rock Island & Pacific; E. J. Lamneck, purchasing agent, Pennsylvania; C. H. Murrin, general storekeeper, Louisville & Nashville; E. A. Clifford, general purchasing agent, Chicago & North Western, and retiring chairman; G. A. Goerner, general storekeeper, Chicago, Burlington & Quincy; and E. W. Walther, general storekeeper, Baltimore & Ohio, while C. E. Smith, vice-president, New York, New Haven & Hartford, was re-elected to the General Committee for one year.

The reports and papers presented during the closing session were in part as follows:

Report on Material Handling Facilities

More argument for good roads and lift truck equipment—Savings in reduction of rehandling outlined



W. S. Morehead
Chairman

Roadways are essential to the economical handling of material. One large railroad has constructed during the past year 2.93 miles of concrete roadways through store and shop grounds, ranging in widths from 6 ft. to 18 ft. The roadways under 15 ft. are 7½ in., 5 in. and 7½ in. thick without reinforcement other than dowel bars at the expansion joints. The roadways of 15 ft. and over are 9 in., 6 in. and 9 in. thick, reinforced with ½-in. bars for the longitudinal joints. The cost averaged approximately \$2.25 per sq. yd.

The pallet and fork types of hand and power trucks have great possibilities, and the practicability of their use should be studied very carefully in the installation of any material-handling equipment. Motorcycles or motor traffic cars equipped with carrying boxes are excellent for light deliveries up to one-half ton. They are especially suited for deliveries in car yards.

Special trailers and skids should be furnished for like material moving both ways in intershop, interstation or line shipments. Items that lend themselves to such handling are journal brass, air hose, brake beams, triple valves and items stripped from locomotives for movement to and from cleaning vats. Such skids or trailers can be made in local shops out of second-hand and scrap materials.

Special cars should be provided for handling material which

lends itself to a two-way movement between stations or stores, such as mounted wheels, renovated packing, flues between shops for swedging, etc.

Handling Expense

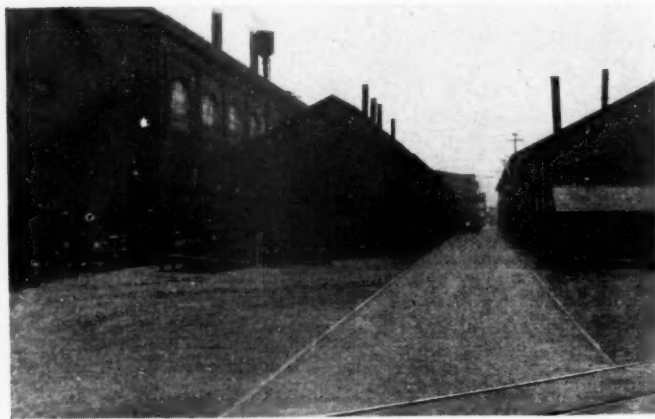
The greatest saving to be made in handling material is to avoid duplicate handlings. It has been determined, by actual



Platform with Extended Sides for Bar Iron



Roadways—Before



Roadways—After

check on one railroad, that by giving careful consideration to the method of ordering, to the instructions for shipping, and by providing proper equipment, handling can be reduced from 15 or 16 to 6 or 8, and that the amount handled per hour can be increased from 200 lb. to 4,000 to 6,000 lb. per man, while the speed of handling can be increased from 3 m.p.h. to 6 m.p.h.

In preparing purchase orders, consideration should be given to the advantages of ordering in carload lots, the movement of carloads direct to point of use, the use of open equipment, the use of separators or bundling to assist in unloading at destination, and the use of standard packages. In redistributing material to other points on the railroad, small shipments through freight houses should be avoided. Auto trucks should be used in interplant or station movement, for small lots of material, to save switching and delays. Auto trucking is cheaper than switching.

Material should not be removed from skids or trailers where it is to be reshipped to another point within a short period of time. Storage space should be provided in storehouses and yards for material on skids or trailers in transit, to avoid the expense of piling or placing the materials in bins.

The committee consisted of W. S. Morehead (chairman), general storekeeper, Illinois Central; D. Corcoran, general storekeeper, Chicago & North Western; J. U. King, general storekeeper, Atlantic Coast Line; A. S. McKelligon, general storekeeper, Southern Pacific; H. E. Ray, general storekeeper, Atchison, Topeka & Santa Fe; H. M. Smith, general storekeeper, Northern Pacific; J. W. Wade, general storekeeper, Norfolk & Western; E. W. Walther, general storekeeper, Baltimore & Ohio; L. B. Wood (chairman ex-officio), general storekeeper, Southern Pacific.

Discussion

L. L. Studer (M. P.): The committee recommends special trailers and skids for the handling of such items as journal brass, air hose, brake beams. What did the committee have in mind on a special trailer for that kind of material? The most

economical manner to handle such items, which are used in large quantities, is exclusively in skids, letting them remain in the skids until the contents are used.

Mr. Morehead: We say "trailers or skids." There are operations where the fellows don't have skids. In such cases they may want to use special trailers for that purpose, but a skid operation is a better operation than a trailer operation.

A. B. Lackey (Sou.): On page 12 of this report is a cut showing 37 pairs of wheels. What distance are they handled? In switching cars loaded in this manner, we often lose wheels in the yard. Our cars carry 19 pairs. If I put 37 pairs on a car I would be saving a lot of upkeep of equipment, and I handle at least a hundred cars a month.

J. T. Kelly (C. M. St. P. & P.): We make these wheel cars by taking an old car that is ready to be taken down, using a center sill of another dismantled car, and cut holes to fit the wheels so they just drop in. We doubledeck all wheels and ship them way out in Montana. We cross the fields on the axles and then we tie them with U-irons, both ends of the wheels, so they cannot jump, and we have no trouble in losing wheels. Blueprints and photographs of that car are available to anybody that might want them.

D. R. Elmore (F. G. E.): Is the \$2.25 a square yard, as shown on page 2, for constructing roadways, out-of-pocket cost, or does that include all the elements of contractors' price, such as overhead?

Mr. Morehead: The figures given us represent full value, full cost, furnished by a railroad that has built these roadways in the past year.

C. H. Murrin (L. & N.): The roadway is at the South Louisville shops of the L. & N., and that represents the cost built under contract.

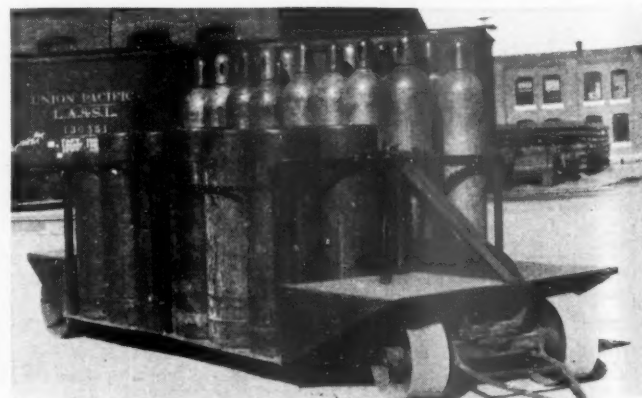
S. P. Warmack (M. P.): In regard to special cars for the handling of materials as listed on page 3, renovated packing is mentioned. We ship our packing in iron barrels and use Class C equipment. Have you some special design in mind for the shipping of this packing?

Mr. Morehead: The cars are not specially constructed.

B. T. Adams (I. C.): We have gone into the question of



Traffic Car for Handling Light Material



Handling Gas Cylinders

ordering material quite extensively, and we specify on our orders how the material should be shipped to us, how it should be separated. We have accomplished a great deal in that respect. Bar iron, sheet iron, jacket steel, galvanized, and stove pipe iron; we show how they should separate it, make one pickup and put the material right on a rack without having to restack. The mills have co-operated with us very successfully and without any extra charge. We have reduced our cost of handling on these heavy materials very substantially by doing that.

J. K. McCann (C. B. & Q.): All over the railroad properties you will find tractor and trailer operations over roads that are not as good as they might be. Concrete has been recommended as standard, and it is the best road available. Concrete won't last forever. But we have some concrete roads in service getting very heavy use for a great many years. They are cheaper in the long run than cinder or even gravel roads. The better roadway

gives quicker and more dependable service. It is a whole lot easier on your equipment, and you will reduce your maintenance and operating cost of equipment.

D. R. Elmore (F. G. E.): I would like to see next year's committee devote more detail to the different types of roads that might be developed for the main lines and also the auxiliary lines.

H. C. Ralls (M. P.): The cuts show all these trailers on iron wheels. Iron wheels just tear up a concrete roadway. Doesn't the committee think they should have rubber tired wheels?

Mr. Morehead: Rubber tired wheels are preferable, particularly on concrete roads. The only question involved is the expense.

C. H. Murrin (L. & N.): On these concrete roads on the L. & N. last year we went entirely to rubber-tired trailers. *The report was then accepted.*

Report on Fire Prevention

The report of the Railway Fire Protection Association for 1935 indicates that 65 railroads reported a total of 4,829 fires and the total loss was \$3,273,927, or a decrease of \$393,682 for 1935 as compared with 1934. In the stores department during 1935, there were 102 fires, with a total loss of \$21,689

FIRE LOSSES—STOREHOUSES			
Per Cent of Value			Per Cent of Fires
64	From smoking, trespassers, incendiarism, spontaneous combustion, etc.		46
17	From lighting equipment		3
16	From unknown causes		14
2	From acetylene torches, open-flame torches and burning right of way		23
1	From exposure		14

RAILROAD FIRES*				
Year	Storehouses		Cross Ties and Lumber	
	No. of Fires	Value	No. of Fires	Value
1931	44	\$57,385	146	\$47,353
1932	32	41,744	123	14,781
1933	25	20,963	13	13,624
1934	65	15,652	56	9,778
1935	35	14,724	67	6,965

* From statistics of the Railway Fire Protection Association.

for buildings and materials, as compared with 121 fires and total loss of \$25,430 for 1934, or a decrease of 19 fires and \$3,741 in buildings and materials.

During the past year or two there has come into use on the railroads in greater quantities than ever before, liquified petroleum gases (Butane and Propane), and it is important in shipping liquid petroleum gas to employ the proper equipment and connection when handled either by the tank cars or smaller containers. When handling in tank cars, the same precaution as to blue flags, derails and bonded joints should be observed as in handling the unloading of gasoline.

The report was prepared by W. F. Sanford, district storekeeper, Chicago & North Western.

Discussion

A. S. McKelligon (S. P.): A good thing to do is to have a fire prevention committee, and have them go around about twice a year, particularly before the dry season. There is a general committee on each division, the stores department also has a committee, selected from stockmen and foremen, who go around and make a check on every part of the property, and then make a report to the Storekeeper.

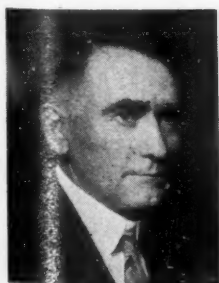
Chairman Clifford: Did you find that condition existing generally?

Mr. Sanford: All stores departments have fire committees that go around periodically, checking the stores department, buildings, and grounds, to see that they are all kept in good condition.

There being no further discussion, the report was accepted as read.

Report on Simplification of Materials

New ways of reducing sizes and varieties of railway materials outlined—study electric lamps and patterns



A. G. Follette
Chairman

In answer to a questionnaire, lists of wire and cable were submitted last year by 35 railroads. The material was classified according to use as "Signal," "Communication" and "General" (including building, equipment and traction use). An analysis of these lists is given in the table below.

The number of items of each type is approximate, but conservative. The analysis shows that there are too many steps in voltage capacity, thickness of insulation, size and number of conductors, and too much variety in types of covering or finish. The

border lines between the three classes are somewhat indefinite. If the railroads would purchase this material to a common

specification and confine purchases to a simplified list, lower prices and quicker delivery would result, along with adequate

Type	No. of Items		
	2-A Signal Items	2-B Communication Items	25-E General Items
Aerial	34	..	..
BX armored	4	..	..
Flame-proof	13	..	30
Insulated weather-proof	43	..	..
Line wire, weather-proof	8	..	..
Lead covered	35	132	73
Metallic parkway	171	28	..
Non-metallic parkway	42	..	..
Tough rubber-jacketed	23	..	184
Miscellaneous	..	38	368
	373	198	655
Grand Total	1,226		

protection of service with a smaller stock of material. This is at present an active subject in the electrical section of the

association. The Signal and Telegraph and Telephone Sections will collaborate in the work. It is recommended that the portion of this report pertaining to this subject be abstracted and sent to the three above-named sections of the association.

Electric Hand Lanterns

The demand for electric hand lanterns of the trainmen's type is increasing. The committee is giving consideration to the simplification of parts for servicing these lanterns, but information is not yet fully developed. It is, therefore, recommended that the subject be brought to the attention of the Signal Section, soliciting its collaboration, particularly with reference to standardizing the color of electric bulbs used in the lanterns.

Carbon Brushes

The committee has had under consideration the simplification of carbon brushes. A great many different sizes of brushes are used, with a wide variety of shunt lengths, shunt locations and shunt terminals. This, combined with the numerous grades of brushes, makes it an exceedingly complicated commodity for simplification. There is, however, a good field for simplification by the individual roads. Simplified Practice Recommendation, R56-35, of the United States Department of Commerce will be found a useful guide in simplifying brushes and shunts. One railroad reports that three sizes of brushes without shunts and of the same grade are used in large quantities. The largest size is purchased, and when worn to the limit the stubs are shaped to the next smaller size with a carborundum cutting wheel. When this size is worn to the limit, the stub is again reshaped to the smallest size. A very attractive saving was made in this way.

Electric Lamps for Signals

Lists of electric lamps used for signal purposes have been received from the lamp and the signal manufacturers. The different types of lamps are shown in the table.

Shape and Size Bulb	Number Different Lamps	Shape and Size Bulb	Number Different Lamps
A17	2	W6	3
A19	6	S8	12
A21	1	S9	1
CT8	19	S11	120
G4½	1	S14	40
G6	28	S17	1
G10	11	S19	2
G16½	27	T2	8
G18½	14	T3½	4
PS16	51	T6	3
RP11	12		
		Total	369

The variables are voltage, wattage, style of base, shape of filament, light center lengths, and tolerance of light center length and axial alinement. For the same lamp, the greater the precision required in light center length and axial alinement, the higher will be the price of the lamp. Arrangements have been made with the Signal Section for collaboration in the standardization and simplification of these lamps.

Rolled Wheels for Engines

A list of the various patterns of rolled steel wheels for engine trucks sold to the railroads by the several steel mills has been forwarded to the Mechanical Division, and it is now under study by a subcommittee of that division to the end that the number of patterns be reduced.

Hand Lanterns, Brushes, Saws

The development of a standard trainmen's lantern in collaboration with the Signal Section is progressing. A 7/8-in. wick tube burner is favored, but the adoption of this as standard would not provide for unification of the present variety of 5/8-in. wick tube burners in use on many roads.

Digests of various specifications and brush dimensions covering 23 items of brushes have been prepared from information furnished by the railroads and have been forwarded to the Mechanical and Engineering Division with request that standard specifications be developed.

A simplified list of wood-cutting band saws was submitted by one of the large railroads. This list is the result of a study made on that road and represents a reduction of sizes of 72 per cent. It was also found that saws up to and including 1¼ in. in width could be economically cut and joined at railroad shops. This avoids the necessity of carrying in stock saws joined to lengths suiting the several sizes of machines. Attention is called to the trade practice of designating the size of teeth by points per inch, by the distance from point to point. To avoid confusion, this practice should be followed in ordering saws, as there is always one more point than teeth per inch.

Patterns

Some study has been given by your committee to the possibility of saving in the modification of designs of right-hand and left-hand patterns, forgings, etc., so that they can be applied in right-hand or left-hand position; or by designing the rough patterns so that they can be finished either right or left. A list of representative items lending themselves to such treatment include bell cranks, truck boxes, driving boxes, engine and trailer truck boxes, brake heads, valve bushings, steam pipe casings, eccentric cranks, crossheads, crosshead gibs, crosshead guides, valve crossheads, cylinders, cylinder bushings, cylinder heads, cylinder and valve chest casings, driving-wheel centers, drill and machine frames, main frame, grate bars, guide yokes, d. b. fulcrum levers, d. b. hanger levers, link supports, union links, nozzle tips and exhaust stands, pedestal caps, shoes and wedges for pedestal, crank pins, knuckle pins, wrist pins, radius rod lifters, eccentric rods, main rods, radius rods, side rods, smoke box fronts, smoke stacks, bases and extensions, spring saddles and hangers, and valve spool and bull rings.

The committee consisted of A. G. Follette (chairman), general material supervisor, Pennsylvania; J. E. Conroy, district storekeeper, Chicago & North Western; W. J. Dixon, supervisor material standards, Missouri Pacific; E. A. Ernst, traveling storekeeper, Chicago, Rock Island & Pacific; W. M. Hinkey, material supervisor, Baltimore and Ohio; J. L. Irish, assistant general storekeeper, Union Pacific; C. J. Irwin, purchasing agent and storekeeper, Gulf, Colorado and Santa Fe; J. K. McCann, inspector of stores, Chicago, Burlington & Quincy; W. H. Morris, general storekeeper, Reading; G. P. Turner, division storekeeper, Southern; and C. B. Toby (chairman ex-officio), general storekeeper, Lehigh Valley.

Discussion

L. C. Thomson (C. N.): Is the B wick a ¾?

Mr. Follette: The ¾ is all we have heard of—¾, 5/8 and ¾.

Mr. Thomson: The B wick is ¾?

Mr. Follette: That is the one recommended by the Signal Section so far.

J. T. Goodlow (Sou.): What advantage do you find in the ¾ over the 5/8, or is it just for the purpose of simplification?

Mr. Follette: Some tests were made on a lantern of one manufacturer and there was greater luminosity in the ¾ burner than in the 5/8. It used also a little more oil and it was slightly less subject to extinguishing by wind. The difference was that the wind machine was capable of 52 miles an hour; and the



Special Type Trailers for Moving Lumber

$\frac{5}{8}$ wick blew out at 50 miles an hour, while the $\frac{7}{8}$ wick didn't blow out at 52 miles an hour.

C. H. Murrin (L. & N.): We purchase quite a bit of the standard tinware of the A. A. R., ordered as such. We have procured it from several of the concerns supplying it. We notice variations in the height and diameter of dimensions, possibly also in the gage of the metal. What is the possibility of

assuring the interchangeability of caps, the can screws or tops?

Mr. Follette: One of the manufacturers has been making the can screws for the other, so that they might interchange. But possibly there is constructive criticism there—and that we ought to dovetail the threads of the can screws so that they will interchange.

A motion to accept the report was carried.

Remarks of R.B.A. President

H. A. Wheeler, president of the Railway Business Association, was then called on and his remarks are abstracted below:

After we came out of the period of government operation and into private control again with a completely disorganized machine, as much wrecked as you could possibly wreck anything and still have it run, you had to put it all back in shape again and get control of your forces, rebuild your mechanism and go on to the stage which you have reached today; it gave such an illustration of the futility of public control of an enterprise like transportation, that I never could see how anyone could conceive the idea that we ought to go back to that stage again.

The public have come to be more interested in railroads partly because you have given them new devices to see it, and partly because the education of the past few years through the depression has brought you a little closer to the real working forces of the country. The recognition as between your needs and their needs has become very pronounced. My appeal is to capitalize that all we can. There are forces on the other side that are determined that because the world trend of transportation is a state control, particularly of rail transportation, therefore it is inevitable that this country would some day come to the same thing. It is fallacious that there is any relation between world conditions and state control in the countries of the world and the conditions here in the United States, and the methods by which our transportation is being so steadily improved and so wonderfully operated.

I have never been able to understand how the whole force that has anything to do with receiving transportation facilities as well as furnishing them, should ever allow to get into their minds one single thought that this country would be better off if we had more public control. We have had enough of it in the private enterprise of railroad transportation.

We have enough interference—enough control over management, enough taking to itself the functions that management ordinarily assumes. If you have had more of it, you men can picture what would happen to your own interests if the transfer of final authority should go over into the public, the state or federal control, instead of the private control you have always been used to.

The R. B. A. has not much function as a trade organization. We were started 25 years ago to try to interpret the railroads to the public, and as the work of 1937 we are writing a book on government ownership to discuss both sides of this question, examine every interest that is affected by transportation, and what the effect of government versus private ownership would be on that industry. It will be done in August and I am going to see that you all get copies of it because it is a most masterful analysis of the futility of state control of rail transportation. Each side is put up just as clearly as can be done and yet, after you have read the arguments for and against, you can only reach one conclusion if you have a fair and unbiased mind.

We have also started to make a historical record—each country by itself—of the first transactions in steam transportation, who owned the railroads, who built them, what kind of franchises there were, why did the state ultimately come to control them, or why was there a division between the state and private enterprise. What was the result of state enterprise and what was the result of private enterprise as in Great Britain, for instance? In that way you could pick up any country you might want to and read the story of the development of rail transportation in that country, and the reasons why it became state-owned if it is (and many of them are); and the utter futility of trying to apply that principle to what we have in the transportation machine in this country.

So you are going to have another book in the month of August.

There will be about 250 pages in each. But they are so set that you can, by your index, take any particular phase of this question that you want, both historical experience and the actual economic experience of government versus private ownership.

When this depression began we had heavy inventories; we had a business that had been built in production up to its maximum. We had all of the conditions of an industrial or economic boom suddenly flattened out. In these last years, through this period of depression, the amount of capital that has been released from inventory carrying, because of the rapidity of transport movement and the accuracy with which you can make and have made your deliveries, has released an amount of capital that is almost beyond computation.

This is what it has done: In a period of great depression such as we have been through, where capital was needed for other purposes, to cover deficits in operation as well as for general operation, the amount of capital that you have released from inventory carrying and from charges that result from a heavy carrying of inventory has been one of the things that has saved this country from greater depths of depression than we have been through, and they have been deep enough.

The public does not understand that. When they want to go anywhere, they know the railroad is there. It is just like the air they breathe. They go to the place where the train comes in and get on it, and go on to their destination. It is one of the services they have come to expect, and it is one of the perfectly natural things in their lives. They don't go behind the scenes to see what is transpiring in order to give them what they want.

Neither does the shipper. He takes up some new form of transportation where he thinks he can do it at less cost to himself than shipping by rail. He does not realize that if he cripples the rail movement or retards its progress because of his use of other forms of transportation, he is destroying the thing that he must depend upon in the last analysis, because no scheme of highway or waterway or air or pipe line could ever replace the carrying qualities of the railroads themselves. If you break down the machine that must be finally depended on by the people of this country and the economic life of this country, in producing the thing that is necessary for their welfare, you have thrown out from under the whole fabric of transportation this foundation that has been so well laid under private enterprise.

I am not disturbed about what we are up against today. In the last analysis the American people have a wonderful amount of good sense.

Ultimately we are going to come out all right, but the battle is ours. In this transportation situation you have the open door to any kind of a socialistic state that may be conceived. If this government ever reaches a point where it controls the ownership and operation of steam railroad transportation, there is no economic interest in this country that is safe from the same kind and measure of control.

Government regulation induces mediocrity enough but government ownership and control and operation would present a problem of mediocrity that the public would finally begin to see, but too late to do anything about it.

And the reason it is too late, Mr. Chairman, is this: We all went through—or most of us did—the period of the War and what flowed from governmental control of rail transportation. We saw what happened, and when in 1920 we went into the conferences to find a proper bill by which these agencies of transport could be brought back again into private ownership, we found that disorganization which although it had only been going on for a short period of time, was so great that it gave us the illustration of what would happen if Senator Wheeler's bill, introduced into the last session of Congress, requiring the

Government through a special board, to take over and own and operate all Class 1 railroads, not what they might pick—all of them—was passed.

You each have your own sphere of influence. You can introduce this subject, because the public is waiting for information on it. They can see your streamlined trains. They understand these things that are the visible evidences of railroad progress. But they don't know the under-part of it, the handling of millions of dollars and the method by which you are going to make it not only the most economical to the transportation system of the country, but also the safest and soundest and best method

of handling that vast volume of material that runs to so much money and that means really the underpinning of the transportation system.

Talk about it. Think about it yourself. Educate your friends to dismiss from their minds that any such bill as was in the last session of Congress will never come in again for expectation of passage. Cranks will always introduce strange legislation. You can't stop that. But the other thing about it is that it shall not be given enough public recognition or public approval, unintelligent public approval, that will give it an opportunity to start.

Report on Stationery and Printing

Revisions in paper specifications and other methods of reducing railway expenditures presented



(c) Moffett
B. B. Melgaard,
Chairman

The committee recommended that the specifications for paper used in printing interline waybills, November 1, 1936, Proceedings of the Accounting Division, be changed to read: *Rule 3. Paper for Printing Interline Waybills.*—In printing waybills, use paper not less than 75 per cent sulphite, not less than 25 lb. to a ream of 500 sheets, size 24 in. by 36 in., manufacturers' standard basis of size (instead of 30 lb., 24 in. by 36 in., now shown), and not less than 20 lb. to the sq. in. breaking strength under the Mullen test. By correcting this specification for weight without

sacrificing strength, a saving in cost of approximately 10 per cent is obtained. It was also recommended that printing on the reverse side of all waybills be eliminated. A review of thousands of waybills showed that the actual use of yard stamps on backs of waybills did not justify the extra expense for printing. It was also noted that when stamps were used on the back of forms, no uniform sequence was obtained. The omission of this printing will amount to at least 10 per cent additional saving. These recommendations were approved by the committee on freight accounts of the Accounting Division and were submitted at the 1937 annual meeting for adoption.

It was further recommended that a subcommittee of the committee on freight accounts be appointed to work with the stationery and printing committee to standardize other forms and promote the more general use of the A.A.R. standard size, 7½ in. by 9½ in. The committee on freight accounts co-operated to the fullest extent.

Bills of Lading

In our 1936 report, it was recommended that the size, 8½ in. by 7¼ in., be considered, and that the form be printed across the 7¼-in. dimension to permit more lines and thus avoid the need for a full size sheet. Investigation has developed that the Interstate Commerce Commission regulations require the width of bills of lading to be 8½ in. Therefore, last year's recommendation should be withdrawn. It is recommended, however, that the small size bill of lading be used wherever possible. A number of railroads are now using the smaller size form for 50 per cent to 75 per cent of their requirements.

Shipping Tags

It is recommended that the specification as adopted at the 1936 annual meeting be changed to read: Shipping tag No. 5, size 4¾ in. by 2¾ in., 90 lb., No. 1 Sulphite Kraft, basis 24 in. by 36 in., not less than .009 in. thick, and to have a breaking strength of not less than 90 lb. per sq. in. under Mullen

Test, tag to have patched eyelet hole, and when printed, use black ink.

Train Orders

The committee reviewed samples of train order forms submitted by 56 carriers and it was noted that some railroads use two or more sizes. Widths vary from 6 in. to 8 in. and lengths from 7 in. to 11 in. The majority of railroads use size 6½ in. to 7 in. wide by 7 in. to 9½ in. long. The committee recommends that a uniform standard be adopted to effect consistent economies in stock and printing and that consideration be given to standardizing on size 6¾ in. by 8¾ in. While some carriers may feel that this is too small to give the writing space necessary, at least an inch can be saved by closing up the heading.

Car Cards

Investigation develops that many railroads are using an inferior quality of stock for Bureau of Explosives placards. The quality, size and printing of these placards are mandatory. It is urged that all railroads exercise extreme care to see that their purchases comply with I. C. C. recommendations.

Standardization of Paper

In 1931, the stationery and printing committee recommended size 7½ in. by 9½ in. Subsequent committee reports have enlarged on the recommendation, yet many members have not adopted this recommendation for letterheads. The saving amounts to 23 per cent on paper stock and a similar saving on carbon paper.

Quality of Paper

The committee has investigated the subject of quality of paper for railroad forms and recommends the more extensive use of paper known as 11-lb. low sulphite because of its strength and economy. While some printers and paper supply houses may not have this paper in stock, the adoption of this paper for interline waybills will cause it to be used more extensively and more railroads will then be in a position to benefit by its use. Substituting this grade of paper will result in a saving of approximately 15 per cent to 20 per cent in cost as compared with 14- and 16-lb. White Sulphite Bonds. Some railroads have already substituted 11-lb. sulphite sheet for printing forms formerly handled on news print, parchment and railroad manila, because of greater strength and better writing surface, and at a comparatively small additional cost.

The committee consisted of B. B. Melgaard (chairman), assistant to purchasing agent, Chicago, Milwaukee, St. Paul & Pacific; H. C. Boldebuck, stationery buyer, Chicago, Burlington & Quincy; W. J. Duff, stationery storekeeper, Atchison, Topeka

& Santa Fe; J. L. Gorsuch, stationer, Western Maryland; W. W. Griswold, stationer, Chicago, Rock Island & Pacific; B. Kocher, stationery storekeeper, Canadian National; O. B. Mills, assistant general storekeeper, Pennsylvania; G. E. Perrot, sta-

tionery supervisor, Seaboard Air Lines; J. T. VanHorn, stationer, Missouri Pacific; E. G. Walker (chairman ex-officio), assistant general purchasing agent, Atchison, Topeka & Santa Fe.

This report was accepted without discussion.

Exchange of Surplus Material



R. D. Long
Chairman

The original purpose of the committee was to aid railroads in disposing of surplus material to other railroads, and to afford them the opportunity of purchasing such material as they may be in the market for, at a saving. Suggestions have been made as to methods of advertising surplus materials for sale, whereby the reporting railroads can save time and money in preparing such advertisements. One of the suggestions was that the surplus lists be confined to items that are generally standard.

Several surplus lists were reviewed

and it was found that a great many items are still reported only by pattern or forging number, these numbers being peculiar to the railroad reporting, and conveying no information to any other railroad which might be in the market.

One of the railroads stated that the surplus list was prepared and mailed to 80 Class-I railroads at a cost of \$205. This list disposed of material in the amount of \$474. It will be noted that \$269 was realized through the sale of this material. The amount of material shipped to other lines was in very small quantities, for example, one sale amounted to \$1.76, another \$32.80, another \$1.50, and another \$7.30. Therefore, when taking into consideration the cost of packing, shipping, road haul, etc., the saving was very small.

One of the questions raised in our investigation of the subject was whether or not railroads should continue the endeavor to make these exchanges or whether they should try to dispose of this material to second-hand dealers.

The committee made several recommendations: Surplus lists should be written on the A.A.R. surplus form. (1932 Proceedings) Separate sheets should be prepared for each material classification. In order to further facilitate the disposition of surplus materials, when railroads are in the market for second-hand material, they should first direct their inquiry to other railroads within the region. Surplus material should be advertised more extensively to private car lines or short line railroads in the immediate territory in which the surplus is located.

The committee consisted of R. D. Long (chairman), pur-

chasing agent, Chicago, Burlington & Quincy; F. S. Austin, assistant purchasing agent, New York Central; W. J. Diehl, purchasing agent, Mobile & Ohio; U. K. Hall, general purchasing agent, Union Pacific; C. H. Kenzel, purchasing agent, Elgin, Joliet & Eastern; A. W. Munster, vice-president, Boston & Maine; C. E. Walsh, general purchasing agent, Pennsylvania; A. C. Mann (chairman ex-officio), vice-president, Illinois Central.

Discussion

E. W. Peterson (Bang. & Aroos.): I suggest that the committee consider exchange of surplus material through the regional stores group meetings. At the eastern stores group meeting we have actually made exchanges of material, and it does reduce the cost. The report mentioned one railroad that spent around \$200 in preparing and mailing a surplus list. I recall receiving some time ago a very large surplus list from a large railroad on the West Coast. Our railroad happens to be on the East Coast. The freight charges would be tremendous from the West Coast to the East Coast, and I bring that up as an example of the better effects on exchange of surplus material through regional stores group meetings.

Mr. Kenzel: That was one of the things I had in mind: that in the effort to make these exchanges, they lose sight of the enormous amount of transportation that sometimes has to take place in order to get it from the holder of the material to the possible user. That reduces the real financial gain that is many times expected.

George A. Goerner (C. B. & Q.): If a road wishes to dispose of surplus it ought to prepare the reports in the best and most comprehensive manner. The list should be made separate by classifications. It ought to be made in duplicate so the general storekeeper may retain one copy in his office, and send the other copy on the road, if he wishes to do so. Any material peculiar to the equipment on the reporting road should not be included on a list sent to another railroad. Neither should any material that could be used on that road by a substitution be included. The lists ought to be condensed to items that could profitably be sent to some other railroad and items that are of some value, and if the lists are prepared in that manner we will have better results than we have had in the past.

The report was then accepted.

Report on Material Guarantees



J. T. Kelly
Chairman

Material Guarantees should be written and quite clearly define the responsibility of the manufacturer, producer, agent or contractor who supply the material. The guaranty may or may not limit the responsibility of the guarantor, or bind the guarantor to a full and complete warranty. Manufacturers who fully guarantee their products are primarily liable, under the law, for material failure of any nature. The form or wording of the guarantee should be left in the hands of the particular railroad making the purchase or the contract wherein material is specified. Some

guarantees cover a long period, such as 10 years or more. As far

as possible, the guarantee should specify what constitutes failure, inherent or otherwise. In case of failure, a complete statement of facts should be promptly obtained in order to notify the vendor.

While it is true that specifications, either manufacturers' or purchasers, and a guarantee, are separate subjects, the terms of contracts refer to "the described material" made in accordance with "defined specification herein and is guaranteed to, etc." Consideration should, therefore, be given to any relationship of the guarantee and specification, especially in contracts.

Every railroad should adopt a method of following to conclusion every guarantee or guarantees, applying to any equipment or material.

The committee made some investigations of the method of recording guarantees and finds varied practices. The usual practice is to record and file with the contract. Other rail-

roads neither keep special records nor follow any definite method of recording guarantees.

The committee consisted of J. T. Kelley (chairman), general storekeeper, Chicago, Milwaukee, St. Paul & Pacific; J. L. Brown, purchasing agent, Seaboard Air Line; E. A. Jones, purchasing agent, Lehigh Valley; I. H. Lance, general storekeeper,

Delaware, Lackawanna & Western; H. M. Rainie, purchasing agent, Boston & Maine; A. C. Simmons, purchasing agent, Chicago Great Western; M. E. Towner, general purchasing agent, Western Maryland; and J. L. Bennett (chairman ex-officio), purchasing agent, Central of Georgia.

This report was accepted without discussion.

Stockbooks Versus Stock Cards

In which two past chairmen present opposing viewpoints on the best system of records for storekeeping

The report was prepared by a committee of two, consisting of H. E. Ray, general storekeeper, Atchison, Topeka & Santa Fe system and a past-president of the Railway Storekeepers' Association, and L. C. Thomson, manager of stores, Canadian National Railway, and a past-chairman of the Purchases and Stores Division, who presented separate statements of their experience with and preference for the system of stock records in use on the two railroads. The statements were, in part, as follows:

Stockbooks



H. E. Ray

While the variety of methods used in compiling a stock record is only limited, apparently, by the number of railroads in operation, one basic principle is the vital need for comprehensive information as to the condition of the stock at all times. Such a record is more than a mere record of current business. It should be a permanent record. The record would be more successfully maintained permanently if prepared in book form. It should not be overburdened with data not pertinent to the stockman's job and cause him to become

more or less of a clerk rather than a material man.

Stockbooks in the Majority

A number of roads have obliterated the real value of the stockbook by a large amount of information that burdens the record. None seem to have agreed entirely with the standard form approved by the Purchases and Stores Division, but a great majority find that a stockbook is preferable to any other method of handling this particular problem. Some of these stock records are too large to be comfortably handled in the warehouse. A book ruled for a 12 months' record, with 25 or 30 items to the page and plenty of blank lines left for additions, to be printed or mimeographed, loose-leaf, but with permanent binding, will contain all the essential information necessary to stockmen and the storekeeper. At the same time, it will be easy to handle. Such a record eliminates the possibility of mislaying or losing individual cards or slips. It can be much more easily studied by both the storekeeper and stockman, the information is more easily located, and when the year's cycle is complete, the entire history of the store activities is retained in permanent form.

Some roads prefer to handle surplus through the medium of special reports and by concentrating such items at a general store, keeping division and local stores comparatively free from such material. Other roads stress the importance of controlling surplus through more or less elaborate records embodied in the stockbook. I am inclined to the former method, as the information concerning such material is more or less specialized and is not always within the province of the individual stockman.

Some roads are using master stockbooks. They entail considerable labor, no matter what method is used, and it is questionable whether the results obtained warrant the expenditure.

Other roads are using the master stockbooks in the main office merely to record changes in standards, authority for new materials authorized and such information as is of value to the storekeeper rather than the stockman. This appears to be a valuable record and one that justifies its maintenance.

Stock Cards



L. C. Thomson

We have 110 storehouses serving our 23,000 miles of railroad, and you can walk into any one of them, ask any question about material, and the staff can give the information on the spot, or you can pull out the bin card and read it for yourself, and it will show you the activity of the commodity, its value and a complete history of the article.

The card system is a superior method to stockbooks as a medium of stock control for many reasons. They are less expensive. Cards with perpetual inventory data keep the storekeeper informed as to the status of an item of stock each time an issue or receipt is made, enabling him to take immediate necessary action to protect that stock. They serve as an efficient medium in pricing. They identify all items which have remained inactive during the past requisition period, eliminating delay caused by checking or counting stock on hand to determine this. They are indispensable in quick and thorough inspection of stocks by inspectors or other supervisory officers. Checking of cards discloses inaccuracies which the stockbook method fails to show.

Cards lend themselves to the use of markers or clips for various identification purposes, such as inactivity, obsolescence, manufacture in the shops, not to be re-stocked, secondhand, etc. They reduce time and labor in the preparation of stock requisitions, store orders and surplus lists, as you have as many as 60 items in view at all times, and those items to be dealt with are clearly indicated by signals. They keep items in their proper place and class, avoiding the necessity of carrying forward, as is sometimes necessary with the books, when new items are stocked, shifted, etc. They permit two years' record to be visible at all times. Cards are only written twice in four years. They permit more workers to work on records at one time, each panel carrying 120 items. They permit more workers to make requisitions, statements, or take information from stock records without interfering or disturbing others. They permit the use of photostating for inventory purposes, which eliminates calling, checking and typing and eliminates possible consequent errors in connection therewith.

Cards, with a stock investment of approximately \$25,000,000, enable our stores to turn in an inventory to the comptroller each year, neatly compiled in detail, priced, extended, totaled and summarized, with supporting statements. "Material received and not invoiced," "Material invoiced and not received," etc., without overtime, 30 days after it is taken. It is necessary to work some overtime in the actual taking of stock in order to com-

plete it quickly and without interfering with the daily issues and receipts.

Policing Surplus

We keep only active items at division stores, and the instructions are that items which become inactive must be sent to district stores, and items which reach that category are watched carefully by our inspectors and other supervisory officers. We aim at a turnover of 33 per cent at all such points, and many of them run over that figure. District stores are very similar to a general store on a small railroad. We concentrate inactive or surplus material at eleven points.

When stock is taken at these points each month, a canary-colored clip is attached to each card covering inactive or surplus items, and after the items for purchase or manufacture on store order have been requisitioned, the panels are again gone over and all items showing this canary-colored signal are listed and the lists interchanged with each of the above-mentioned district points. We prepare a number of copies of such lists, and instead of making new lists each month, corrections only are issued.

These lists are compiled in class order and when they reach the other stores, the lists are referred to the storekeeper of the particular classes concerned, and he checks his stock immediately and prepares requisitions for any of the items listed, if necessary. If within a reasonable time, the surplus material is not liquidated, it is further investigated with the using department and a report submitted and the matter is finally dealt with by the general storekeeper and the chief officer of the using department. After an item has been referred to the general storekeeper, a red signal clip is attached to the stock card, which brings it into a special listing category until disposed of. We have still another category into which inactive material falls, which is signaled by a black clip to indicate material held for one year, again investigated with the using department and still held at their request.

In the absence of Mr. Ray, the paper on stock books was presented by Clair Holmes (A. T. & S. F.).

J. C. Kirk (C. R. I. & P.): The advantages in stock cards are that they make a better historical record. You can go into a store-room and look at a stock card and tell how long the material has been in stock to better advantage than you can with a stock book.

On the other hand, there are advantages with the use of the A. A. R. stock book. It gives you a catalogue of every item that you carry that you can put in every storehouse that you have on the railroad, and when new items come up, and new equipment is transferred to a division, the storekeeper can look up his catalogue and get the proper ordering record. It also serves as a master book for the general storekeeper's office, and those of us who have had this master stock book are hardly prepared to give it up. We have emergencies, washouts, we also have engines tied up occasionally, and it is a handy and convenient record to look up and find where this material is

located, so that we can transfer it to the place where it is needed. The master stock book is not expensive to operate. We have to have a night man for counterman and we put a clerk on instead of a laborer, and have him post the line stock books when he has no material to deliver over the counter. In that way the cost of operation is practically nothing to us.

George A. Goerner (C. B. & Q.): Every so often an auditor gets the opinion that we operate the stores department so that we might account for materials, but the reverse is true. We account for material because we operate the stores department and maintain a stock book of material. Therefore, the stock record becomes a most important record. Price records, payrolls, and all other records become secondary. Since the standard stock book has been approved by the Purchases and Stores division we have progressed in storekeeping. There have been many changes. I can speak for a railroad which is halfway between the two records. When we adopted the master stock book, we had three general stores carrying locomotive and car material and miscellaneous supplies. We had two general stores carrying roadway and building supplies, and most other stores carried some roadway and building supplies. Today we have two general stores carrying roadway supplies, and one general store carrying all other materials except lumber. Our condition has changed decidedly. For that reason today we operate single item stock books at most of our smaller stores, and at all local stores. The Milwaukee and several other railroads are also operating single item stock books. There is no longer the same need for the master book that there was years ago. The surplus flows to the general stores, and we have a different control at the local stores. A 25- or 30-item stock book seems very cumbersome, especially for a small division or a local store. The single item stock book gives you every advantage of the card record, except the record at the bin, and the opportunity to photograph your inventory. There may be some advantage to knowing at the bin what the using of the material is. When it comes to finding out what we have at hand I would rather look at the material than a card at the bin, as it gives me a more accurate record. We operate on the Burlington a strike-off in the stock book which gives us the same information that you would find at the bin, on the cards. In fact, it gives us a net figure after requisitions that are held are filled, as the net quantity on hand after filling all orders.

If the authority is vested in the storekeeper to send in his surplus, and secondly, if the authority is imposed upon him to care for his stock, it should make little difference what type of stock records he has, in order to follow this up. Our storekeepers have the authority to slip in surplus, and they have imposed upon them the right to follow their stock.

As far as transfer of material is concerned with the single item stock book, you can transfer material and send the individual sheets to the other point just as readily as you can with the stock card. Since we have had Zephyrs we have to do a lot of that. We change the routing of a Zephyr to some other point. We take out certain sheets of the stock book and transfer the material with the stock book.

The papers were accepted for information and study.

Closing Business

Following the presentation of the reports of the Subject Committees, the reports of committees on resolutions, memorials and nominations were received and the election of officers and members of the General Committee were then held, whereupon the convention adjourned. The results of the election are published elsewhere in this issue. The concluding remarks of the retiring chairman were as follows:

Chairman Clifford: Before I turn over this gavel to my successor, I want to tell you how greatly I appreciate the assistance and support that I have had from every member of this organization. I thank you for your wonderful and continuous attendance at this meeting.

... Chairman Clifford then handed over the gavel to Chairman-Elect Sorensen. (Applause).

Chairman-Elect Sorensen: I deeply appreciate the honor you have conferred upon me in selecting me as your chairman. I take up the duty with the realization of what it is necessary

for me to do to measure up to the wonderful work done by your recent chairman. I only trust that I can meet these high standards that have been set. The success of this institution can be attributed to the wonderful co-operation of all members and I know you will continue in this spirit of co-operation.

Will you not please feel free, as you always have done, to make suggestions to your officers? We invite them and hope you will continue to make them at all times. We need them—you need them.

Our retiring chairman started having general committee meetings about every two months, and I feel that the success of the work this past year has been in some measure due to the fact that he has held the meetings as often as he has and that he has made every one of us work real hard. I know you will continue to do that, and I hope that we will have as successful a year as this one has been.

The convention adjourned at 12:30 p.m.

Sixth Mechanical Division Session

Reports presented on draft gears, brakes and brake equipment, and wheels

THE sixth and last session of the A. A. R. Mechanical Division was called to order at 9:30 Wednesday morning, June 23, with Chairman Burnett presiding. With all special addresses and in-

dividual papers out of the way, the meeting was confined to the presentation and discussion of committee reports on Couplers and Draft Gears, Brakes and Brake Equipment, Wheels, and election of the General Committee.

Report on Couplers and Draft Gears

Tight-lock couplers—Proposed yoke changes—Second-hand coupler specifications and reclamation practices—Progress report on draft gears



R. L. Klein
Chairman

The construction of high-speed, light-weight passenger equipment and the desire to eliminate that portion of shocks, jerks, noise, etc., that occur in handling of passenger trains attributable to free slack in the contour of present standard couplers, has developed a demand for a tight-lock coupler, that is, a coupler in which there would be no slack action in the contour lines.

To meet these demands your coupler committee requested the coupler manufacturers to study the problem and develop a tight-lock coupler that would adequately meet these requirements. In response to this there were a number of individual designs developed by the coupler manufacturers. On account of the additional expense of developing and maintaining several designs, the coupler manufacturers were requested to pool their individual ideas and develop a single standard that will adequately meet the requirements for such a coupler. The general prerequisites of the design were that the tight-lock coupler should be free from slack, capable of coupling with present A.A.R. standard couplers and equivalent in strength to the standard Type-E coupler. The coupler manufacturers have been working diligently on this problem and have developed a tight-lock coupler that conforms with these prescribed requirements.

Tight-Lock Couplers

The proposed tight-lock coupler embodies in design those several features such as strength, interchangeability, angling, etc., that were agreed upon by the mechanical committee of the coupler manufacturers as essential fundamentals. The parts of this coupler are similar in appearance to those of the Type-E coupler, but, excepting the knuckle pins, none of these parts are interchangeable.

No free slack is provided in the design of this contour. The lock and the locking face of the knuckle tail are provided with a bevel or taper, so that the lock forces the knuckle tail tight against the side wall and holds the knuckle rigid with respect to the coupler head. Guide wings are located at either side of the coupler head. These wings align the couplers into correct relation with each other during the coupling operation and maintain this unit relation after the coupling is completed. When

completely coupled the knuckles and front faces of engaging couplers are locked tight and all buffing loads are carried through this central column.

[The general design and major features of the proposed tight-lock coupler are shown in 19 drawings and photographs, only four of which are included in this abstract of the report, on account of space limitations.—Editor.]

The major advantages attributed to the proposed tight-lock coupler are: Eliminates the slack in coupler contour; will couple with present standard couplers, and when so coupled provides substantial reduction in contour slack; insures more positive engagement when coupling at slow speeds; strength is equivalent to that of present standard Type-E coupler; coupler is self-compensating for wear and seating of parts; provides the required amount of vertical and horizontal angling to assure satisfactory operation with present passenger cars equipped with existing types of A.A.R. couplers; the lateral angle between mating couplers is increased; wear of coupler head and parts is materially reduced, thus increasing the service life; elimination of noise caused by coupler slack; no buffing stresses taken through aligning wings or lugs; the lateral gathering range is increased; reduction of fatigue failures in front face and knuckle side wall; prevention of vertical movement of mated couplers relative to each other.

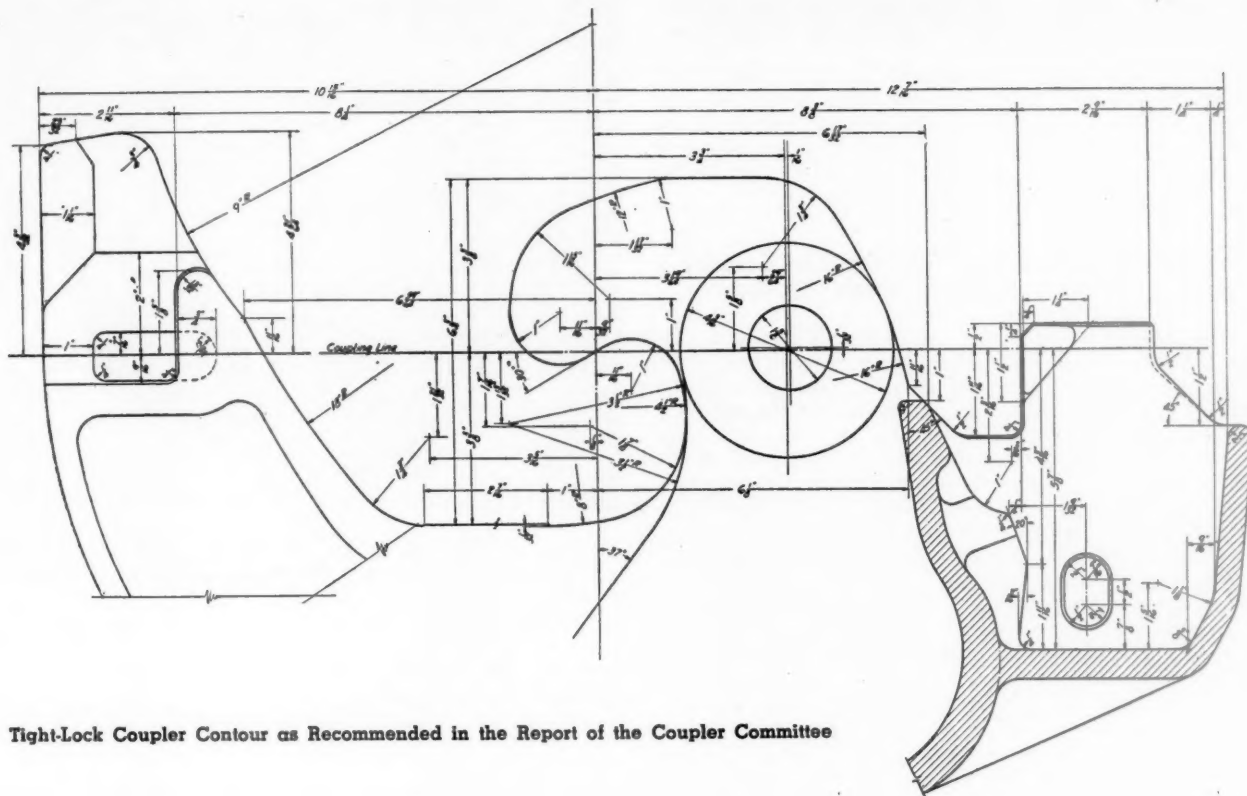
Coupler Operation

The operating principles employed in the tight-lock coupler are substantially the same as those in the Type-E coupler. The coupler is rotary operated. The rotor lever and the lifter link are pivoted together and secured by a rivet. The lifter link, instead of the lock leg, contacts the knuckle thrower to open the knuckle.

The lock is prevented from creeping to an unlocked position by two independent anti-creep engagements between the lock and coupler head. The primary anti-creep consists of a shoulder integral with the leg of the lock which underlies a ledge in the coupler head. Engagement of the lifter link with the lock and with the rear wall of the lock hole holds the lock leg in anti-creep position. The second anti-creep provision consists of a projection on the guard-arm side of the lock that enters a recess in the locking wall of the head.

Coupling Conditions

The range within which the tight-lock couplers can be successfully mated, both on straight track and curves, was determined a coupler angling machine suitably arranged for



Tight-Lock Coupler Contour as Recommended in the Report of the Coupler Committee

the purpose. Numerous coupling trials in this machine, using couplers with shanks varying from 3 ft. 6 in. to 5 ft. 5½ in. long from the coupling line to the pivot pin, showed that the tight lock coupler has a considerably wider range of coupling than the Type-E coupler. The gathering range is also materially increased. This marked improvement is accomplished by means of the gathering or aligning wings with which the coupler is provided. The fact that these wings always bring the opposing couplers into proper alignment for mating assures positive engagement of couplers even at very slow speeds. Momentum is not necessary to effect positive knuckle closure.

The illustrations show two tight-lock couplers angled laterally relative to each other an approximate maximum amount to permit successful alignment and coupling; the limits of lateral angling within which the couplers will properly align and mate; and two tight-lock couplers displaced three in. vertically, relative to each other, to permit successful alignment and coupling.

Interchangeability

The proposed tight-lock coupler will satisfactorily couple with present standard couplers, and when so coupled the contour slack that is normally $\frac{25}{32}$ in. between two Type-E couplers will be reduced to $\frac{15}{32}$ in., an improvement of 40 per cent. This combination when coupled permits 6½ deg. horizontal angling and 2 deg. vertical angling.

There are in service on cars of the Pullman Company approximately 500 special Type-E couplers provided with a special lug on the knuckle side of the coupler head to protect the train lines in event of a slip-by. The tight-lock coupler will not couple with these couplers unless this special lug is removed. The Pullman Company has indicated its willingness to make this change.

Material

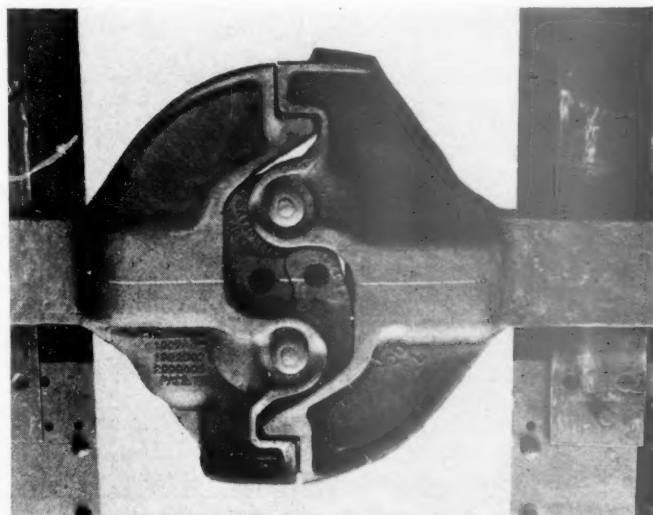
Strength—The tight-lock coupler has been designed to be equivalent in strength to the Type-E coupler. Much of the interest shown in tight-lock couplers to date has been in connection with new light-weight passenger train equipment or with the rebuilding and lightening of existing equipment. The tight-lock couplers of this design that have been furnished for service were manufactured of high tensile steel in order to

take advantage of weight reduction. The coupler can be manufactured in Grade-B steel, but it will be necessary to increase present metal sections and weight if present strength is required.

The couplers that have been tested to destruction have fractured through the special design shank having an integral yoke at the rear end. The average tensile strength obtained in these tests was over 518,000 lb., with no apparent indication of head or knuckle fracture. The first .01 in. permanent set of knuckles occurred at a load of 250,000 lb. These results indicate strength exceeding that of the standard Type-E coupler.

The tabulations of results of the angling, coupling and physical tests made under the supervision of your committee were not complete when this text was prepared, but appears as a supplement to this report.

Weight—The tight-lock coupler, to a point 12 in. back from the pulling line, including complete fittings made of high-tensile steel, weighs 304 lb. normal, as compared with a weight of 320 lb. for the Type-E coupler of Grade-B steel.



Top Plan View Showing Couplers Engaged with Cars on Tangent Track

Service—There are, as of May 10, 1937, approximately 300 of this proposed tight-lock coupler in service and 400 additional on order.

Existing Cars—To provide for vertical and lateral angling for tight-lock couplers provision must be made in the coupler attachments. New cars can be readily designed to accomplish this result. To apply the tight-lock coupler to existing cars may involve changes in center-sill construction and coupler supports, depending upon design of cars.

Revision of Manufacturing Tolerances of Coupler and Draft Attachments

Several roads have had serious experience with a group of all-steel refrigerator cars derailing, for which at first there seemed to be no apparent cause, either with respect to condition of track or equipment. Continued research into the cause of these cars getting off the track indicated that the cars were being restricted in their lateral movement by resistance of the coupler to angling in negotiating curvatures. It appeared that the rigidity of the coupler was occasioned by the draft-gear pressure exerted against the butt of the coupler due to a slight compression of the gears in keying the coupler into place.

A study of this condition disclosed that if the draft key was to the maximum width, $6\frac{1}{16}$ in., the key slot to butt dimension of the coupler was maximum length $4\frac{3}{32}$ in., the back of yoke to front of the key slot was minimum dimension $34\frac{1}{16}$ in., and the gear pocket of normal dimension $24\frac{5}{8}$ in., the assembly of such a combination would result in compressing the draft gear $\frac{7}{32}$ in. less than normal $24\frac{5}{8}$ in.

If a combination occurred with opposite extremes, $\frac{1}{8}$ in. free slack between the coupler butt and the follower would result.

It was the feeling of the majority of your committee that the manufacturing tolerances in the draft key, coupler butt and coupler yoke dimensions should be altered to provide as much as possible against a combination of conditions where the draft gear would be compressed by the coupler butt and the coupler restricted in its lateral movements to the extend it would not permit the cars to adjust themselves to normal curvature conditions.

It is therefore recommended that the following changes be made in these dimensions (See one of the drawings showing present dimensions and tolerances and proposed dimensions and tolerances). As previously stated, the present tolerances provide for a possible $\frac{1}{8}$ in. free slack and $\frac{7}{32}$ in. gear compression. By changing to the recommended tolerances, the possible extremes would be $\frac{5}{16}$ in. free slack and $\frac{3}{32}$ in. gear compression.

To conform with the revised dimensions, the following changes are recommended on the coupler and the draft-gear plates as shown in Manual of Standard and Recommended Practice, Section C-29 and C-32, and Supplement to the Manual,



Couplers Centered—Stationary Car Coupler Knuckle Open—Movable Car Angled to the Left the Maximum Degree to Align and Couple

page 101, plate 214; page 136, plate 321; page 236, plate 508-B; and page 238, plate 510-B.

Sections C-29, C-32, Proposed Form—Coupler Key Slot—Distance of key slot from end of coupler butt, $31\frac{15}{16}$ in. min.; 4 in. max.

The distance of coupler horizontal key slot from butt end has considerable influence on the rigidity of draft gear, and the committee has found that $\frac{1}{32}$ in. makes a difference of a few thousand pounds in compression. The committee, therefore, recommends that this distance be established at four in. and tolerances be made plus 0 in., minus $\frac{1}{16}$ in.

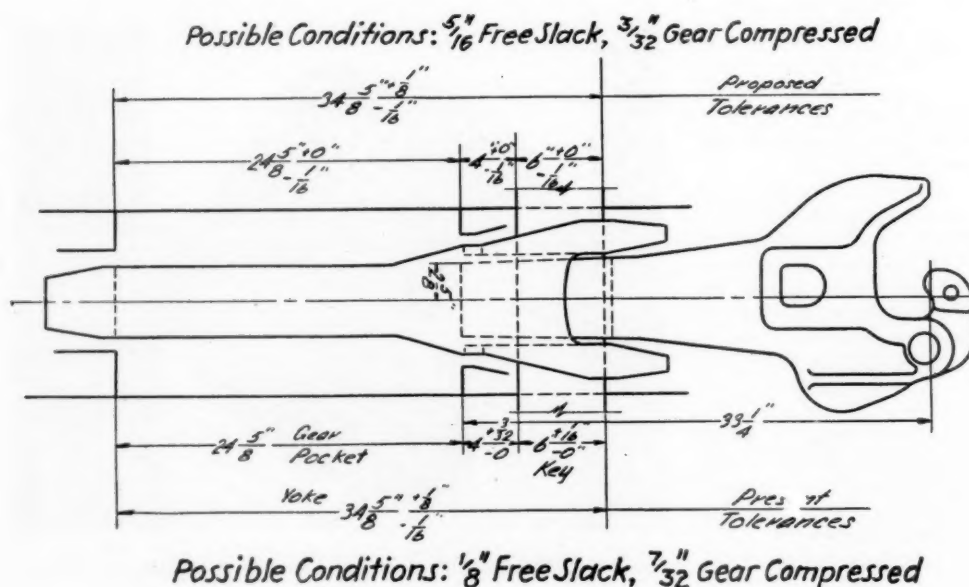
SUPPLEMENT TO MANUAL

Page 101, Plate 214, Proposed Form—Coupler horizontal draft key—Max. width of key 6 in.; min. $5\frac{15}{16}$ in.

The horizontal draft keys are generally uniform in width, but to obtain more flexibility in lateral movement of coupler, the committee's investigation reveals that it is desirable to reduce the minimum width and maintain the same tolerances of minus $\frac{1}{16}$ in. and plus 0 in.

Page 136, Plate 321, Proposed Form—Key Slot in Yoke—Distance from extreme end of coupler yoke pocket to extreme end of key slot, max. $34\frac{3}{4}$ in.; $34\frac{1}{16}$ in.

No tolerance had been established for the yoke dimension



A.A.R. Standard Type E Coupler—Proposed Changes in Tolerances Affecting Draft Attachments

between the front end of key slot and back end of gear pocket. It is important that a maximum and a minimum tolerance be established, of minus $\frac{1}{16}$ in. and plus $\frac{1}{8}$ in.

Page 236, Plate 508-B, Proposed Form—Draft Gear Pocket in Center Sill—Max. length $24\frac{5}{8}$ in.; min. $24\frac{1}{16}$ in.

At present, no tolerance is established for length of draft-gear pockets in sills. Any variation in the length of the pocket is reflected in the compression or looseness of the draft gear. The committee recommends that a minus $\frac{1}{16}$ and plus 0 in. be made standard.

Vertical Cast-Steel Yokes with Increased Draft-Gear Bearing Area

The present standard vertical cast-steel yokes have a tendency to depress the base of some of the certified draft gears on account of contacting the gears in the central section of the

plane swivel yoke in high-tensile steel were conducted in the laboratory of the Buckeye Steel Castings Company, with results as shown in the accompanying table.

Tests show that the changes to improve the back end construction of the cast-steel yoke considered in this investigation have also improved slightly the strength of the yokes. This increase in strength is perhaps due to the approximate 36 per cent increase in bearing area between the yoke and draft gears thereby decreasing the bending moment at the back end of the yoke.

Vertical Cast-Steel Yoke—Increased Length of Gear Pocket

The length of the gear opening in the present standard vertical-plane cast-steel yokes is $24\frac{3}{4}$ in. and therefore does not provide for any appreciable lengthening of the draft gear

Physical Tests of Proposed Vertical Plane Horizontal-Key Yoke and Swivel Yoke

	A.A.R. Spec.	Vert. plane horiz. key yokes, Grade B Steel				Vert. plane swivel yokes, High-Tensile Steel			
		Present		Modified		Present		Modified	
		Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
No. of tests		6		5		2		5	
Perm. set at 325,000 lb. ....	.031 in. Max.	.013 in.	.026 in.	.010 in.	.015 in.	.000 in.	.000 in.	.001 in.	.001 in.
Avg. set at 325,000 lb. ....			.018 in.		.012 in.		.000 in.		.001 in.
Avg. ultimate strength	550,000 lb.		652,000 lb.		666,000 lb.		640,300 lb.		646,200 lb.
Avg. load at .031 in. set.	325,000 lb. Min.		365,000 lb.		377,000 lb.		455,000 lb.		458,000 lb.

gear base. In considering the design of the yoke from this standpoint it was found that the draft-gear bearing surface of the cast-steel yokes could be appreciably increased without sacrificing any other desirable features.

[The changes that have been made in the vertical-plane horizontal key yoke, and the redesign of the A.A.R. vertical-plane swivel yoke are shown in drawings which could not be included in this abstract of the committee's report.—Editor.]

In the vertical-plane horizontal-key yoke, Grade B steel, the bearing area has been increased 67.5 per cent and the weight of the yoke has been decreased 2.5 lb.

In the high-tensile steel yoke, the increase in bearing areas is 36.8 per cent with an increase in weight of 2.8 lb.

In the A.A.R. vertical-plane swivel-yoke, Grade B steel, the bearing area has been increased 36.4 per cent and the weight increased 0.7 lb., while the same yoke in the high-tensile steel the area has been increased 36.8 per cent and the weight increased 3.1 lb.

Physical tests of the proposed vertical-plane horizontal-key yoke in Grade B Steel and the proposed design of the vertical-

due to wear on followers, stops, etc., without the gear becoming tight in the yoke.

The Mechanical Committee of the coupler manufacturers was requested to give consideration to this feature in the process of redesigning the standard vertical-plane yoke. It recommends a change that can be made in the head of the yoke and increase the nominal length of the gear opening from $24\frac{3}{4}$ in. to 25 in.

The Mechanical Committee of the Coupler Manufacturers in presenting the foregoing revisions also recommends that in order to provide better foundry practice in casting the vertical swivel yoke in high-tensile steel a minor change in the design of the head be made as shown in one of the drawings.

Your committee agrees that these changes in the design of the vertical cast-steel yokes, with respect to increasing the area of contact of the yokes with the draft-gear base, increasing the length of the draft-gear pocket and changing the design of the vertical swivel yoke in high-tensile steel are desirable features and recommends they be incorporated in the standard yoke designs.

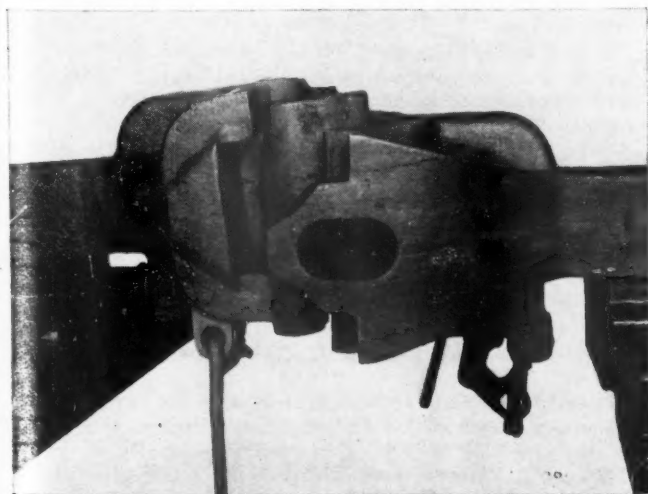
Draft Key Retainer with $\frac{5}{8}$ In. Thick Head

A recommendation has been received from the Committee on Car Construction relative to providing for the use of a draft-key retainer with a head $\frac{5}{8}$ in. instead of 1 in. thick head, as shown in the Manual, Plate C-28-B. This request was made on account of there being in service a number of old cars in which the end-sill construction is such it will not accommodate the standard retainer.

The Coupler Committee concurs in making provision for the use of a draft-key retainer with a head $\frac{5}{8}$ in. thick to be applied only where clearances prohibit the use of the standard retainer. Interchange Rule 3, Par. d-3, should be supplemented with a note to the effect that where the draft-key retainer with head 1 in. thick is not applicable to existing cars on account of vertical head clearances, a retainer with a head $\frac{5}{8}$ in. thick will be recognized in interchange.

Type "D" Couplers Opening in Service

During the year it was brought to the attention of the committee that some trouble was being experienced on certain roads on account of Type-D coupler knuckles coming open



Side Elevation of Couplers Showing Maximum Vertical Displacement to Align and Couple

in service due to an ineffective anti-creep. This condition was being corrected by some roads applying corrective measures in accordance with their own individual ideas.

Your committee considered this subject of such importance that immediate steps should be taken to set up a proper procedure for meeting this situation on the Type-D Couplers. In co-operation with the coupler manufacturers' mechanical committee a suitable method for dealing with this proposition was developed and outlined in Circular DV-899, issued March 8, 1937.

Uncoupling Mechanism To Be Used When Substituting Type-E Coupler for Type-D Couplers

Some confusion has arisen in connection with the substitution of Type-E Couplers for Type-D Couplers on account of certain detailed changes required in the operating mechanism. The condition was of such a nature it seemed advisable that immediate instructions be prepared and sent out to the membership and not await the formality of handling the subject through the committee's annual report. Accordingly, Circular DV-898, March 8, 1937, entitled "Instructions to be Observed When Substituting A.A.R. Standard-E Couplers for A.A.R. Type-D Couplers" was issued to the membership.

Bottom Rotary Uncoupling Mechanism for Type-E Couplers

Your committee has been requested to design a bottom rotary uncoupling mechanism that will be free from patents. This has been progressed with the Mechanical Committee of the coupler manufacturers and several designs have been evolved and tested.

It is hoped that a definite recommendation for a standard can be submitted shortly. Before this can be done it will be necessary to submit the design to patent counsel to insure its being free from infringement.

Specifications for Secondhand Couplers

A review of the history of the improvements made in couplers discloses that in 1926 the Type-D coupler shank was increased in strength approximately 20 per cent in the region of the key slot. About the same time the knuckle side wall of the head was redesigned to reduce the failures in this location.

In 1930, important changes were made in the lock and the front face of the Type-D coupler head. These changes materially improved the operation of the coupler and the strength of the front face.

In 1931 Type-E coupler was adopted as standard. This design of coupler further increased the strength of the shank, front face, knuckle side wall and other important sections. The ease of operation was also materially improved.

In view of these important developments it is felt that the value of secondhand couplers should be set up on the basis of the design and strength of a new coupler.

It is also felt that all secondhand couplers for application to freight cars in interchange should be required to meet certain definite specifications in order that reasonable service life may be assured.

With these points in mind, your committee, with the co-operation of the Mechanical Committee of the coupler manufacturers, has prepared specifications for secondhand couplers and recommend modifications in certain rules in the present A.A.R. Code. A proposed specification for secondhand couplers is shown as Exhibit 1, and appended to Exhibit 1 is an assembly of the present standard reclamation practices for the reclamation of couplers and parts shown in the A.A.R. Mechanical Division proceedings of 1932 (pages 479 to 505 inclusive) with certain additional requirements for secondhand couplers. It is recommended that this be issued to the membership in pamphlet form.

CHANGES IN A.A.R. RULES ACCOMPANYING THE RECOMMENDATION FOR SECONDHAND COUPLER SPECIFICATION

In conjunction with the recommendation for secondhand coupler specification there are certain modifications in the present



Side Elevation Showing Integral Yoke and Shank—Vertical and Lateral Articulation Obtained Directly Between Yoke and Draft Gear—Length of Shank and Dimensions of Draft Pocket May Be Varied to Suit Car Construction

A.A.R. Interchange Rules that should be given consideration, and the following revisions are suggested for consideration of the Arbitration Committee.

A.A.R. Rule 101—In the relationship of secondhand to new values, the following proportions of prices new are proposed for secondhand couplers: all Standard Type-E couplers 75 per cent; all Type-D couplers, 60 per cent; M.C.B. and temporary, standard couplers, 30 per cent.

A.A.R. Rule 3 (c-11)—In order to reduce the number of "pull-outs," a large proportion of which are probably due to smaller size shanks and also to gain the advantage of the increased strength of the standard coupler, a new paragraph to Rule 3 is proposed to eliminate the use of all 5 in. by 5 in. shank couplers, effective January 1, 1940, and all types of former standard couplers having 5 in. by 7 in. shanks, with the exception of the Type-D, effective January 1, 1942, and to conform with this suggestion, it is recommended that a new paragraph under Rule 3 be prepared.

Rule 104—Par. (a) and (b)—It is recommended that Rule 104, Paragraphs (a) and (b), be revised to read substantially as follows:

(a) 1. Secondhand A.A.R. Type-D and standard Type-E couplers, including swivel-shank couplers and couplers having radial butts or parts of same, shall be charged at prices shown in Rule 101, except as provided in Sec. C (2), Rule 17. Defective couplers or parts removed shall be credited at the allowed credit price for such parts. In the case of missing parts, credit shall be allowed at the credit price corresponding to the parts applied. In no case shall the charge for secondhand couplers exceed the following percentage of the value new: A.A.R. Std. Type-E couplers and parts, 75 per cent of value new; A.A.R. Type-D couplers and parts, 60 per cent of value new.

2. Secondhand cast-steel coupler yokes of 24½ in. pocket spacing and secondhand two-key forged coupler yokes, when both types are designed for 1½-in. by 0-in. horizontal cross keys, shall be charged and credited at 75 per cent of value new.

(b) 1. Secondhand former standard or temporary standard couplers or parts of same shall be charged and credited at 30 per cent of value new. Credit shall be confined to the body, lock, knuckle and knuckle pin. However, when correcting wrong repairs, scrap credit shall be allowed for such couplers and their parts where the Type-D and Type-E coupler was standard to the car.

Revision of A.A.R. Rule 18

In order that Rule 18 be consistent with the requirements of the proposed specification for secondhand couplers it is suggested that this rule be revised to read substantially as follows:

(a) *Worn Limit-Repairs (Without Removing Coupler from Car)*—(1) Couplers, Types-D and E, with distance between point of knuckle and guard arm exceeding 5⅞ in., as measured by gage, must have the defective part or parts renewed to

bring the coupler within required gage of $5\frac{1}{8}$ in., as measured by gage, Fig. C., page 40.

(2) Couplers other than Types D and E (M.C.B. 1904 contour) with distance between point of knuckle and guard arm exceeding $5\frac{1}{8}$ in., measured perpendicularly to guard arm, Fig. C, page 40, must have the defective part or parts renewed to bring the coupler within gage.

(b) *Application—Secondhand or Reclaimed Couplers*—(1) Couplers, secondhand complete, Types D and E, distance from point of knuckle to guard arm must not exceed five inches as measured by gage, Fig. B, page 40.

(2) Couplers reclaimed, Type-E using a new or reclaimed coupler body with used parts to make a complete coupler or using a used coupler body with new or reclaimed parts, knuckle, lock and pin, any or all, to make a complete coupler, the distance from point of knuckle to guard arm must not exceed five inches, as measured by gage, Fig. B, page 40.

(3) Couplers, reclaimed, Type-D using a reclaimed coupler body with used parts to make a complete coupler, or using a used coupler body with a new Type-E knuckle or a reclaimed Type-D or Type-E knuckle and reclaimed Type-D lock and pin, any or all to make a complete coupler, the distance from point of knuckle to guard arm must not exceed five inches as measured by gage, Fig. B, page 40.

(c) *Coupler Bodies—Removal from Foreign Cars*—Coupler bodies, Types D and E, with cracks in knuckle side wall back of knuckle tail, shall not be removed from foreign cars, unless;

(1) Such cracks extend beyond an area three inches above and three inches below the horizontal center line of knuckle side wall or $6\frac{1}{2}$ in. back of front edge of knuckle side wall.

(2) Section is broken out within this prescribed area whose greatest dimension exceeds three inches.

(d) *Reclamation—Coupler Shanks*—In the application of secondhand couplers complete, or secondhand coupler bodies, the shank shall not be less than 21 in. in length from striking horn to crest of worn surfaces of butt, nor less than $3\frac{7}{8}$ in. from pulling (rear) surface of horizontal key slot to crest of worn surface of butt, established with parallel straight edges; otherwise, such body shall be charged at scrap value. Coupler bodies having such minimum dimensions shall not be removed from cars for these defects alone, but if removed for other reasons and are otherwise in serviceable condition same shall be credited at secondhand value, with no allowance for expense of reclamation.

Exhibit of Couplers and Draft Gears

For the information of the membership there is an A.A.R. Exhibit in the Booth immediately adjacent to the Meeting Room, with representatives of the Coupler and Draft Gear Committee and Mechanical Committee of the Coupler Manufacturers in attendance, who will be glad to explain any details of the following which are on exhibition: Proposed standard tight-lock coupler for passenger cars; standard Type-E Coupler in Grade-B and high-tensile steel, rigid and swivel shanks; standard yokes—Grade-B and high-tensile-steel vertical-plane and swivel type; gages for gaging coupler parts; reclaimed Type-D couplers and parts, together with gages used in reclamation; approved draft gears.

The report was signed by R. L. Kleine (chairman), assistant chief motive power, Pennsylvania; H. W. Coddington (vice-chairman), engineer of tests, Norfolk & Western; C. P. Van Gundy, engineer of tests, Baltimore & Ohio; C. J. Scudder, superintendent motive power and equipment, Delaware, Lackawanna & Western; L. P. Michael, chief mechanical engineer, Chicago & North Western; C. T. Ripley, chief mechanical engineer, Atchison, Topeka & Santa Fe; H. W. Faus, engineer motive power, New York Central.

Appendix A—Specifications for Secondhand Couplers

Scope—These specifications cover all secondhand couplers for application to freight cars in interchange.

Inspection and Gaging—(a) Each complete coupler shall be gaged between the nose of the knuckle and the guard arm and shall not exceed five in. as measured by secondhand coupler contour gage shown in Fig. 9.

(b) Couplers must be entirely free from cracks, excessive

wear, corrosion and porosity, or welds not performed strictly in accordance with the practices covered by Appendix A. For inspection purposes the couplers shall be thoroughly cleaned to remove all paint, dirt, excessive rust, etc.

(c) Rigid shank couplers shall measure not less than 21 in. from the horn to the crest of the worn surface of the butt as shown in Fig. 1.

(d) Rigid shank couplers shall measure not less than $3\frac{7}{8}$ in. from the rear surface of the key slot to the crest of the worn surface of the butt as shown in Fig. 1.

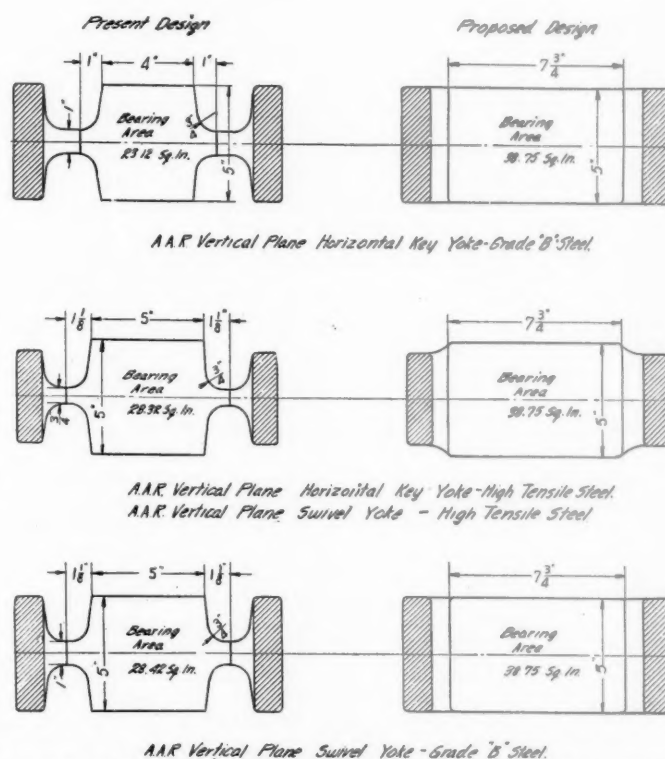
(e) Swivel-shank couplers fitted with swivel-butt castings or swivel yokes shall have not more than $\frac{3}{8}$ in. slack in the swivel joint.

(f) Swivel-shank couplers shall measure not less than $20\frac{3}{16}$ in. from the horn to the rear of the shank loops.

(g) Coupler shanks shall not be worn more than $\frac{1}{4}$ in. deep on the bottom wall from contact with the carrier as shown in Fig. 3.

(h) Coupler shanks shall not be bent out of alignment with the head.

(i) Couplers must properly perform the operations of full



A.A.R. Vertical Plane Yokes—Present and Proposed Designs—Comparison of Areas at Back End for Draft-Gear Bearing

knuckle throw, lock-set, lock-to-the-lock (anti-creep) and locking.

(j) Couplers which do not meet these specifications shall be charged at scrap value only.

Marking—Secondhand couplers having body, knuckle or lock, any or all, reclaimed by welding, must be legibly stamped with the railroad's initial followed by the date applied in the location shown in Fig. 1.

Painting—Couplers meeting these specifications shall not be painted before application to foreign cars and thereafter only when cars are repainted.

(The committee here included complete instructions and drawings covering recommended practices in the reclamation of couplers.—Editor).

Report of Sub-Committee on Draft Gears

APPROVAL TESTS

A certificate of approval has been issued for the National M-50-B draft gear during the past year, thus bringing the number of approved gears to ten. This certificate carries no condi-

tional restrictions as provided for in the 1936 revision of the specifications because this gear has been under development for six years and the committee was therefore able to check up on its service performance prior to issuing the certificate. Another manufacturer who has one gear approved has made application for approval of a new design of gear. Specimens of this gear are now undergoing test in the A.A.R. laboratory at Purdue University.

OTHER LABORATORY WORK

In addition to the work connected with making the approval tests previously referred to, the Laboratory has been engaged during the year in a wide variety of commercial testing for manufacturers of draft gears, truck springs and cars. The laboratory work in connection with the service endurance test of truck springs under the direction of the Car Construction Committee was also completed and report rendered. Some time has been spent in developing new instruments to facilitate testing of draft gears and truck springs.

OBsolete GEARS

Your committee, in conjunction with the Committee on Prices for Labor and Materials, is endeavoring to have all the non-approved gears retired from service as rapidly as this can be arranged for. The means for doing this is to place such gears in the obsolete classification in the Interchange Rules, but in this connection consideration must be given to the length of time required completely to effect such a change. Your committee recommends that all the Bradford, Hall, Murray and Sessions gears now appearing in Section II of the list of friction draft gears given in Interchange Rule 101 be put in Section III under the obsolete classification. Further consideration is being given to placing additional gears in the obsolete list as soon as consistent.

STANDARDIZATION OF DRAFT-GEAR SUPPORTS

During the year consideration was given to the question of requiring all approved draft gears to have such external construction as to be suitable for use with standard carry irons and guides. The chief benefits to be derived from such a requirement would be in connection with the use of horizontal yoke attachments, because with vertical yoke attachments all approved gears take the same carry irons. The manufacturers of the gears who would be affected by such a requirement pointed out that it would increase the weight and cost of these gears. It does not appear that there will be much occasion to replace approved gears on foreign line cars, and car owners will have the proper carry irons for the gears standard to their cars. Your committee is of the opinion that the advantage to be gained by the adoption of such a requirement is not sufficient to justify the increase in weight and cost of manufacture of at least five certified draft gears that would result, and, therefore, will take no further action at the present time.

YOKE AND DRAFT-GEAR SUPPORT FOR A. A. R. STANDARD CARS

It has come to the attention of your committee that this support plate is now located $4\frac{3}{4}$ in. forward of face of rear draft stop, and in this location on account of the design of the rear end of yoke, it rides up on the support plate in the pull position. Joint recommendation was made by the Mechanical Committee of the coupler manufacturers and Coupler and Draft Gear Committee to the Car Construction Committee, that this plate should be moved to a location $7\frac{1}{2}$ in. forward of the face of rear draft stop in order to overcome this objection. This was considered by the Car Construction Committee at their meeting on April 1 and 2, 1937, and they felt that the action of the yoke during longitudinal movement would be so little affected, this change in existing standard drawings is not justified. The matter was further considered at a meeting of the Coupler and Draft Gear Committee on April 20, and it was felt that the improper condition existing should be corrected and accordingly the matter was again referred to the Car Construction Committee for further consideration.

DRAFT GEARS ON REBUILT CARS

As a further step in retiring non-approved gears from service your committee is considering recommendation of an interchange rule requiring approved gears on all cars rebuilt after a certain date. The only complication is that certain cars do not have the standard center-sill spacing and these could be adapted for approved gears only at prohibitive cost. Nevertheless it is felt that some restriction should be placed on the kind of gears that may be installed on these rebuilt cars. Your committee will endeavor to establish a list of non-approved gears which will be acceptable for this purpose and will then recommend an interchange rule to cover.

REPAIRED DRAFT GEARS

During the year, question arose as to the status of National M-17 draft gears which were repaired by the manufacturer so as to make them the same as the approved M-17-A gear. The repairs in question consisted of renewal of friction segments, retaining rods and nuts, springs when necessary, and friction plates in follower wedge. Since these repairs when made by the manufacturer would make the gear the exact equivalent of the M-17-A gear permission was given the manufacturer to designate as type M-17-A (certified) any type M-17 gear that has been so modified, whether new or secondhand.

REGULATIONS FOR MAINTENANCE AND INSPECTION OF DRAFT GEARS

In 1934, a joint sub-committee of the Coupler and Draft Gear and Arbitration Committees submitted recommendations for the inspection and maintenance of draft gears and attachments by car owners which were adopted as recommended practice of the association and incorporated in Circular D. V.-826, dated Jan. 7, 1935, to the members, requesting car owners to see that these Rules are strictly enforced on their own cars in order to improve condition of the couplers and draft gears by the elimination of the slack in the gears as far as practicable.

Under date of June 9, 1936, W. J. Patterson, Director, Bureau of Safety, Interstate Commerce Commission, advised the secretary of the Mechanical Division that the recommended rules covering inspection and maintenance of draft gears and attachments while being reasonably well observed by a number of roads, investigations of accidents attributable to draft-gear failures indicated that it is evident that the recommended rules are not being complied with by some Carriers as well as private car lines. The association accordingly issued Circular D. V.-889, dated Dec. 4, 1936, directing this matter to the attention of all car owners with the request that each railroad and car owner submit to the secretary, copy of existing instructions relative to this subject or a copy of such instructions as may be issued at this time to carry out the intention of this recommended practice. Replies to this circular indicated practically all railroads and car owners have adopted the recommendations of the association and have issued detail instructions covering inspection and maintenance of draft gears and attachments.

Your committee cannot urge too strongly the necessity for proper supervision of the repair points to insure that these instructions are being carried out in order to eliminate failures and possible accidents on the road.

ANNUAL CANVASS OF MANUFACTURERS OF APPROVED DRAFT GEARS

In accordance with the changes in the regulations regarding certificates of approval adopted last year, the secretary of the Mechanical Division made a canvass of the manufacturers of approved gears to determine if our records on these gears are up to date. It was found that the drawings for three of the approved gears have had slight changes made since the certificates were granted. Your committee has carefully gone over these changes and determined that none of them will have any adverse effect on the gears. Arrangements have been made to obtain from the manufacturers involved sufficient copies of the latest drawing to bring our records up to date, and the attention of all manufacturers has been directed to the regulations requiring that

no changes can be made in approved draft gears, without sanction of the Committee, which must be covered by appropriate drawings filed with the Association.

ROAD TESTS

Sometime ago, your committee was instructed to investigate available service records in an effort to discover any evidence that might exist to show, from actual recorded damage, a comparison of the degree of protection to cars or lading afforded by conventional certified friction draft gears and Duryea cushion underframes. It was suggested that at least one member road had maintained such records. It was found, however, that the records of this road showed no comparable facts to prove definitely that Duryea equipped cars have afforded either more or less effective protection to lading than cars equipped with conventional certified draft gears.

The conclusion reached by your committee is that the widely divergent opinions that are held with respect to the merits of the Duryea underframe cannot be harmonized and the real facts determined except by a series of road tests conducted under the direction of the association. Road tests have been conducted by individual railroads, the results of which have been analyzed by your committee. These results are open to question, however, because they were conducted under varying conditions and with different brake equipments. It is unquestionably true that none of these tests was sufficiently comprehensive in character to show a direct comparison of the performance of the Duryea underframe and the friction draft gear under exactly similar conditions and this precludes drawing any definite conclusions as to their relative merits.

It is also the opinion of your committee that when such tests are undertaken, the maximum percentage of recoil which can be safely permitted in draft gears should be determined. A program of tests with estimate of cost is being prepared and will be submitted to the General Committee for their consideration and direction.

This sub-committee report was signed by H. W. Faus, chairman; H. W. Coddington, H. I. Garcelon, L. H. Schlatter and W. Bohnstengel.

Discussion

TIGHT-LOCK COUPLERS

T. P. Irving (C. & O): The action toward development and approval of a tight-lock coupler for use in passenger cars is undoubtedly a move in the right direction. We would anticipate that the elimination of free slack would result also in reduced wear between engaging parts, and a consequent lower maintenance cost. We understand that the parts of the proposed tight-lock coupler are not interchangeable with the present standard E coupler with exception of knuckle pins, owing to the tapered bearing surface between the lock and knuckle in this coupler as compared with a straight or vertical bearing surface at this location in the standard E coupler. It is also understood that this tapered bearing surface is necessary to provide for the automatic take-up of wear between the several contacting surfaces of the coupler parts. Since we cannot look forward to complete interchange of parts between the present standard E coupler and the proposed tight lock coupler it may be anticipated that future consideration will be given to a tight-lock coupler for use in all modern passenger cars and thus restore interchangeability of parts on a single standard coupler, in so far as fittings are concerned.

Perhaps the committee has in mind recommending in the near future a standard size and length of coupler shank for passenger cars. Any reduction in the present number of coupler-shank sizes and lengths would be materially beneficial to the railroads in the cost of repairs. The major advantages of tight-lock couplers enumerated in the report are in our judgment important toward improving passenger-train operation and will assure greater comfort and consequently less complaint from the passengers, in other words improved service to the customer at perhaps lower cost, which is in keeping with modern progress.

It is interesting to note, and of course a desirable feature, that when a tight-lock coupler is coupled with a standard E coupler there is approximately a 40 per cent reduction in free slack as compared with two standard E couplers when coupled, and a

consequent larger reduction if coupled with an old 1904 contour coupler. It is our belief that the manufacture of this coupler should be continued in high-tensile steel and thus avoid the extra weight that would be necessary if furnished in Grade B steel. The present trend of construction is toward lighter weight equipment and the use of high tensile steel is in line with this practice. It is interesting to note that this coupler may be applied to existing cars without great change to present constructions, this fact should encourage the early use of the proposed tight-lock couplers by many railroads, especially for first-class trains.

K. F. Nystrom (C. M. St. P. & P.): The committee has considered the use of one standard coupler length for all passenger cars. It appears that the short-shank coupler could be used for vestibule cars as well as for stub-end cars.

Has any consideration been given to improving the lock lid? We have experienced considerable trouble in the winter time with the bottom lock-lid arrangement. In heavy snow, at high speed, snow rolls down on the track, particularly in cuts, and actually forces up the locking lever and uncouples the train. We have been forced in the winter time on high-speed trains actually to lock the uncoupling mechanism, which is not satisfactory.

H. W. Gilbert (Coupler Manufacturers' Association): During the early part of 1936, the coupler manufacturers were requested to prepare a recommended type of tight-lock coupler. This work was undertaken through the efforts of the Mechanical Committee representing all the coupler manufacturers.

Each manufacturer through this committee was requested to submit a recommended design of a proposed tight-lock coupler. During the early part of 1936 each of the manufacturers did that.

Several meetings were held by this committee among its own membership, also jointly with the sub-committee of your Coupler and Draft Gear Committee that was appointed to cooperate in this work with the Mechanical Committee of the coupler manufacturers.

Our first efforts after the first few meetings was to the effect that we eliminated several of the designs, bringing it down to two types of couplers; one which is your present proposed tight-lock coupler, which has been presented here, and the other was a controlled-slack coupler.

Those couplers have been studied carefully by the Mechanical Committee in cooperation with your committee, and finally a few weeks ago it was decided that the desirable thing to do was to recommend a single standard coupler, which has been presented to you this morning, in the form of the proposed tight-lock coupler.

As stated before, several of these couplers have been put in service, and, so far as we know, the service has been entirely satisfactory. They are being constantly studied with the effort and intention of making improvements wherever it is possible to do so.

We have received some comments concerning providing for more wear and slack take-up. This subject has received attention in the way of improvement up to the present time and will receive additional attention to provide for additional improvement when we are able to do so. One of the important features, however, that we always try to keep in mind is that of interchangeability.

The coupler manufacturers intend, of course, to market this proposed tight-lock coupler on the same basis and plan that has been followed concerning the standard type-E coupler.

MANUFACTURING TOLERANCES

Mr. Irving: Under this subject we find some recommendations concerning existing manufacturing tolerances which might be open to question. It is perhaps desirable to provide some relief from the present practice, but we believe in so doing it is important that we keep in mind necessary repairs to existing equipment. Present rules provide for the elimination of slack between the coupler and draft attachments; therefore, when we apply a new or reclaimed coupler or a new draft key to an existing car, it is desirable that the dimensions in question be toward the maximum in order to eliminate as much slack as possible. Also, if we apply a coupler and draft attachments with the tolerances in the direction to provide the maximum allowable slack under the proposed tolerances, we will just that much quicker reach the maximum slack limit allowed by the present rules. The standard rigid shank and standard key that are concerned in these recommenda-

tions are also used with other draft attachments which have not been concerned in the present controversy on car derailments. Present possible conditions permit $\frac{1}{8}$ in. free slack, while the proposed will give $\frac{5}{16}$ in.

We question whether it is desirable to penalize all coupler arrangements using the $6\frac{1}{4}$ -in. by 8-in. shank for the correction of one arrangement, provided such penalty may be avoided. It is our understanding that the coupler arrangement using the vertical cast-steel yoke is the one that has been concerned in the reported derailments. If this is correct, we would like to suggest that further consideration be given to confining any necessary adjustments in dimensions and tolerances to the length of the vertical cast-steel yoke, making length $34\frac{5}{8}$ in. minimum and $34\frac{13}{16}$ in. maximum, leaving the length of the draft-gear pocket in the car sills as recommended. This further study might also be desirable on account of the fact that the length of the yoke and length of the gear pocket are not at present governed by standard tolerances. Therefore, if the adjustment could be arranged satisfactorily on this basis we would also avoid disturbing present standards.

J. McMullen (Erie): It is noted that these tolerances are being revised because of the belief that the rigidity of the coupler caused by draft-gear pressure restricted the cars in lateral movement, causing derailments.

This subject was discussed at our last car construction committee meeting, and I was not satisfied then that cars were being derailed from this cause.

I do not feel that tolerances should be changed that would permit of undue slack on a new application of draft gears and attachments. We do not expect free lateral movement of a coupler with a new application, and we want to take up all the slack possible. I admit that with a key $6\frac{3}{4}$ in., a minimum length yoke and a butt $4\frac{3}{8}$ in., it may be difficult to apply the key, but even with this condition it does not convince me that this was responsible for these cars becoming derailed.

Draft gears are bound to have some compression when pulled in a train, and when you have this compression you immediately relieve the coupler butt from the follower; then what is to prevent the coupler from angling when you have relieved the butt of the coupler from the follower?

We had one of the same type car derailed on our railroad on May 1. I checked up very carefully and found that the body center plate did not bottom in the truck center plate, due to irregularities on the inside of the vertical flange of the truck center plate. That was what caused the derailment.

H. W. Faus (N. Y. C.): I agree with Mr. McMullen that there was plenty of reason why these cars derailed other than the question of manufacturing tolerances. I have seen detailed reports of the inspection of only two of those cars, but in both of those instances there were obvious reasons for the condition that was found, and it had nothing to do with these tolerances.

Mr. Irving: I would like to make a motion that this part of the coupler report be deleted and referred back to the committee for further action.

(The motion was seconded and carried.)

INCREASED BEARING AREA ON VERTICAL CAST-STEEL YOKES

T. P. Irving (C. & O.): The subject vertical cast-steel yokes with increased draft-gear bearing area provides for increasing the bearing area between the yoke and the base of the draft gear. It also provides for standardizing the back-end construction of all cast-steel yokes. We can see no objection to these suggested changes, and the improvements, namely, increasing the bearing area between the yoke and base of draft gear approximately 36 per cent; increasing the strength of the yokes a small amount without material increase of weight; and reducing the back-end thickness of the vertical cast-steel yoke from 5 in. to $3\frac{1}{2}$ in. will, we believe, fully justify the approval of these recommended changes. The recommended increase in the length of the gear pocket in the vertical cast-steel yoke from $24\frac{3}{4}$ in. to 25 in. is, we believe a desirable change to prevent draft gears binding in the yoke.

DRAFT-KEY RETAINER

T. P. Irving: Concerning the subject of draft key retainer

it is no doubt desirable to make such adjustments as may be necessary to take care of certain classes of existing equipment where present standards cannot be used. The draft-key retainer performs a very important function, therefore care should be exercised not to extend the use of the special thickness head to any service where the present standard can be used.

CIRCULARS D.V.-899 AND 898

T. P. Irving: The two circulars D.V.-899 and 898 are educational and instructive, and we believe the distributing of important information in this manner is highly desirable. We also hope that some definite favorable action will soon result concerning the bottom rotary uncoupling mechanism for the standard coupler.

CHANGES IN A. A. R. RULES

T. P. Irving: The suggested second-hand value of couplers appears desirable for the reason that it should operate to eliminate the older types of couplers from service and will also promote the use of the standard Type E coupler. The result should be fewer train partings and delays, also fewer possible wrecks.

GAGES

The recommendation concerning gaging practice affecting Rule 18 is also a step in the right direction, especially for the reason that it provides increased life for couplers that have been repaired and for second-hand or reclaimed couplers and parts. These improvements are more in keeping with the allowed charges for such materials.

SPECIFICATIONS FOR SECOND-HAND COUPLERS

Appendix A provides for building up coupler shanks due to carrier-iron wear. We would like to suggest for consideration that the $\frac{1}{4}$ -in. dimension be changed to $\frac{3}{8}$ -in. and the $\frac{3}{8}$ -in. dimension be changed to $\frac{1}{4}$ -in. Wear of the coupler shank also of the carrier iron is one of the causes of drooping couplers. We therefore believe that closer maintenance on this detail of repair along the suggested lines may be desirable. As a matter of information, out of 165 scrap couplers on one of our associated lines none were found broken account of coupler carrier-iron wear, and none of these couplers showed any appreciable carrier-iron wear.

Mr. McMullen: With regard to the recommendation for building up butts by welding or by welding a steel plate onto the butt. Personally, I prefer machining off the butt and welding on a steel plate as we then know that we have a square and flat, smooth bearing against the followers, whereas with welding we have no assurance that the butt will be either square or smooth.

The report indicates the method of obtaining proper distance from the key slot to the butt which shows a weld in the slot. This is another point where I do not think you will get either a good job of welding nor a smooth bearing for the key which will result in cutting.

I would like to know what objection there would be to applying a plate of the proper thickness on the butt in order to obtain the $4\text{-}3/32$ in. or 4 in., whatever may be decided on. This will not cause any distortion of the coupler slot and will give a much better job and cost less money.

(This section of the report was accepted and the committee asked to give further study to the questions raised.)

DRAFT GEARS

Mr. Irving: The work of providing approved draft gears under the standard specifications has proven very satisfactory and we believe the committee should continue its work of obsoleting from freight cars all non-approved gears without unnecessary delay.

The suggestion for changing the yoke and draft-gear support for the A. A. R. standard car, should perhaps receive favorable action by the Car Construction Committee in view of the additional information that has been presented by the Coupler Committee. We would like to offer the suggestion that the

present support be moved forward the distance of one rivet hole, which would make the proposed location $7\frac{1}{4}$ in. instead of $7\frac{1}{2}$ in. This practice would permit using two of the present holes in each sill in existing cars and would necessitate punching or drilling but one additional hole. However, if this recommendation applies only to new cars this suggestion would not be important and the proposed location could be followed.

I move that the report be accepted as a whole and be referred to letter ballot, excepting that portion relating to Tolerances which is referred back to the committee for further study, and that the committee give consideration to the suggestions with respect to reclamation as suggested by Mr. McMullen and supported by Nystrom.

(The motion was seconded and carried.)

Mr. Nystrom: I would like to make this statement and if it is in order. I questioned the testing of draft gears on this convention floor seven years ago and I am still of the same opinion. The testing of draft gears, although I have the highest respect for the work of the Draft Gear Committee, does not go far enough. I recommended that it should go further. It may be that my recommendation was not entirely practicable, because the laboratory tests do not reveal service conditions, but the committees' duties should be extended to check the gears in service.

We are buying ten approved draft gears. I think that this body should have courage enough to classify the draft gears so we know what we buy.

H. W. Falls: There seems to be no difference of opinion

between the committee and Mr. Nystrom as to what it will be desirable to do. I understand he believes, and I believe, that in the first place, 25 million foot-pounds is not enough work to put on a gear to find and develop its ultimate worth from an endurance standpoint. We won't accept any gear on our road that will not withstand 100 million foot pounds of endurance work, but it is simply a practical matter of the time required to make the tests. Perhaps the time will come, and I hope it will, when we can extend that requirement, but at the time the requirement was made, we had only one laboratory, so we established a limit which some of us think is too low, but it was high enough immediately to eliminate from further consideration and use a considerable number of deficient though widely-used draft gears. I do not believe that the time has come just yet when we can propose a 100-million ft. lb. requirement.

The committee recognizes the obligation to follow up gears in service, too; in fact, they are undertaking right now to make a recheck of some of these gears that have been in service. Very little has been done yet, because of other demands upon the time of the over-worked engineers' committee. But that is important, it is recognized and it will be done.

Mr. Nystrom: I would like to recommend that the committee be charged in the next year to lay plans for a definite classification of draft gears as to their service life and ability to absorb work.

Chairman Burnett: We will take your suggestion up with the general committee, Mr. Nystrom.

Report on Brakes and Brake Equipment

Changes proposed for Rule 63—Revisions for brake shoe specifications—New standard brake shoe for freight and passenger use



G. H. Wood
Chairman

Gaging and Testing Remounted Air Hose Couplings

In 1917 the Association adopted gages for checking second-hand brake-pipe air-hose couplings which are remounted and returned to service. Question is raised with reference to the non-use of such gages which permits returning to service many couplings which are distorted and which do not function properly.

The couplings are designed to separate with a minimum of resistance when pulled apart such as is the case when cars are uncoupled or

when cars separate from each other for any reason. However, continued separating of the couplings in this manner gradually wears the locking surfaces or distorts the guard arms or lips, particularly when couplings are separated under pressure.

In order to overcome complaints with reference to defective couplings as outlined above, we suggest the general use of the recommended practice gages shown on page 3, section B, of the Manual of Standard and Recommended Practice.

We would also suggest testing such couplings for leakage before returning them to service by means of a special testing device, manufactured by the air brake companies, consisting of a tank, chuck and operating valve. A standard master coupling with plugged end is coupled to the hose coupling under test; this master coupling to be checked at frequent intervals to insure that it is within the limits of the gages for used couplings mentioned above.

Freight-Car Hand-Brake Chains

Recently the Freight Claim Division brought to the attention of our committee, the question of excess slack in hand-brake

chains with request that our present maintenance rules be amended to stipulate a certain amount of slack be provided before cars are released from shops or repair tracks. Since the above rules do not provide a minimum chain slack when installing or repairing hand-brake equipment, we recommend adding to paragraph 103, on page E-40-A, of the Manual of Standard and Recommended Practice the following:

"With the brake-cylinder push rod and the hand brake operating mechanism in its full release position, the hand-brake chain slack should be only sufficient to properly connect the hand brake rigging to the brake cylinder lever."

Cleaning, Testing and Lubricating of AB Brakes

Since the introduction of the AB brake equipment, improvement has been made in the strainer element to protect the internal parts of this equipment against rust, dirt, etc., from the brake pipe.

The construction of these strainer elements is such that a cleaning fluid of some type is required to cleanse them thoroughly at brake cleaning periods before they are returned to service. It is necessary, therefore, to amend the original rules now incorporated in the Manual which covers the older type strainers. We think it is advisable at the same time to suggest some other minor modifications of the above rules and, therefore, recommend the following changes to paragraphs 201 to 203 inclusive, of Section E, pages 46-F and 46-G:

Paragraph 201 changed to read:

"The service and emergency portion must be removed from the car for cleaning and lubricating and replaced by others in good condition."

"The valve portions must be protected from dirt, water and damage, with special covers while the portions are being stored, shipped or transported to and from the shop."

"When replacing valve portions on a car, keep the shipping covers on the cleaned valve portions until ready to place them on the pipe bracket."

Paragraph 202 changed to read:

"The valve portions must be cleaned in a shop where suitable

facilities are provided; they must be dismantled and all internal parts cleaned with gasoline or a turpentine substitute, preferably the former, then blown out with compressed air and wiped dry with a cloth. Before assembling the parts after cleaning, the castings and parts in the valve body must be thoroughly blown out with compressed air and all parts of the valve not elsewhere provided for, must be known to be in good condition.

"All service and emergency portions after being cleaned or repaired must meet the prescribed tests on the standard AB test rack."

Paragraph 203 changed to read:

"The strainer for the AB valve pipe bracket, must be protected against damage while being transported, or placed in the receptacle provided for it in the service portion shipping cover. The strainers must be cleaned with the cleaning device shown in Fig. 1 and in accordance with special instructions relating thereto."

The shipping covers and strainer cleaning devices mentioned in proposed paragraph 203, may be obtained from the air brake manufacturers.

Stencilling of Cleaning Dates for AB Brakes

Several years ago the question of increasing the height of letters and figures used in stencilling the brake cleaning date on cars was raised by several railroads, and it was suggested that the original height of 1-in. be increased to 1½-in. The Arbitration Committee agreed that either the 1-in. or 1½-in. lettering might be used, and many railroads have, since that time, been using the 1½-in. lettering.

Recently the question has again been raised, with the statement that the larger letters remain legible for a longer period,

to protect, as far as possible, the guard arms, locking lugs, etc., from wear, damage or distortion.

Numerous instances have been reported wherein paint, white lead, or other compounds have been found in the hose-coupling groove. We are not advised whether such compounds have been intentionally applied to overcome gasket leakage, or whether such applications have been inadvertently made during the process of mounting, storing, shipping or in the painting of car equipment.

The application of compounds of any nature which will dry out hard and firm, produces the condition which it is intended to avoid, that is, under ordinary service conditions the gasket is seized tightly in the groove and badly distorted in separating hose couplings so that they do not match properly when recoupled and the guard arms and locking lugs are badly distorted on account of lack of proper compression of the gaskets when hose couplings are pulled apart.

The application of any compounds of this type provides only temporary relief, and greatly increases the normal leakage and difficulty of replacing gaskets as soon as the compound has become firm, and is then broken down. We simply call attention to the bad effects of using measures of this kind in order to continue in service couplings or gaskets which should be renewed, and request such care in the handling of hose couplings as will avoid the introduction of compounds of any type into the gasket grooves which interfere with the proper functioning of the gasket.

Braking Ratio for New Freight Cars

The subject of braking ratio for freight cars as shown in the Manual of Standard and Recommended Practice was referred to this committee under date of September 25, 1934, through a

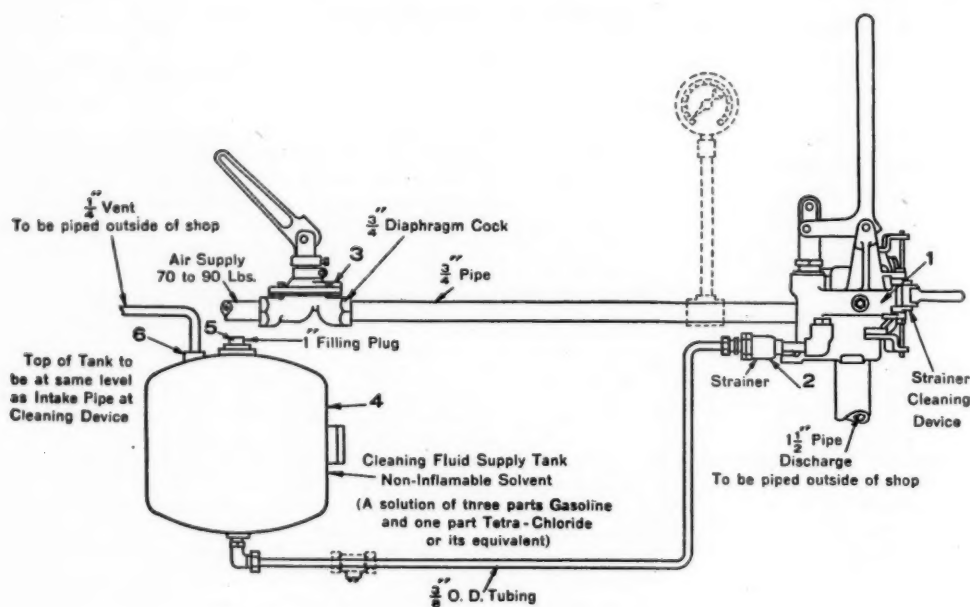


Fig. 1—Arrangement of Cleaning Device for AB Brake Valve Strainers

and since the service period for the AB brake is more than twice that of the K brake equipment, the 1½-in. lettering should be made standard. Since the 1½-in. lettering has been used for several years and has been adopted as standard by some of the railroads, we recommend that the present 1-in. dimension of letters and figures for stencilling cleaning dates for brake equipment be changed to 1½-in., and that the drawings now included in Rule 60 of the Interchange Rules, and shown on pages E-43, and E-45 of the Manual, be changed accordingly.

Hose-Coupling Gasket Leakage

The hose coupling gasket groove is so designed that the gasket may seat properly on the upper side when under pressure and that it may recede sufficiently when couplings are pulled apart to provide for the minimum resistance when separating in order

communication from the Mechanical Advisory Committee of the Federal Co-ordinator with request that A.A.R. standard braking ratios for freight cars, in effect at that time, be incorporated in the Interchange Rules.

After some study by our committee, recommendations were made which resulted in the adoption of the specifications now covered in Rule 3, Section (b), Page 9, of those rules.

Subsequent to our action as stated above, we were requested to give consideration to the matter of braking ratios for light-weight freight cars. This question was considered and we recommended the specifications now appearing on page 5 of Circular DV-866 of May 25, 1936, in which it was proposed that the braking ratio for light weight freight cars be as follows:

"When the marked nominal carrying capacity of freight cars is more than three times the light weight, such cars shall be equipped with an approved design of empty-and-load brake.

"The braking ratio of freight cars equipped with empty-and-load brakes shall not be more than 60 per cent of the light weight of car based upon 50 lb. brake-cylinder pressure.

"The braking ratio of such loaded cars shall be 30 per cent of the marked nominal carrying capacity plus the light weight of the car, based upon 50 lb. brake-cylinder pressure."

These recommendations were adopted as recommended practice.

Following this action we were requested to consider recommendations for braking ratios for new freight cars irrespective of type, weight, capacity, etc., in order that a standard might be fixed for all such cars.

In considering the subject, the provisions of paragraph 9, Section (b), Interchange Rule 3, was included so that our recommendations would cover all the requirements now existent for braking ratios for new freight cars. After considering the matter thoroughly, we recommend the following braking ratios for new freight cars:

(a) *The minimum braking ratio for new freight cars shall be 18 per cent, preferably 20 per cent, of the gross rail load, based upon 50 lb. brake cylinder pressure.*

(b) *The braking ratio for new freight cars equipped with empty-and-load brakes, shall be not more than 60 per cent of the light weight of the car, based upon 50 lb. brake cylinder pressure.*

The braking ratio of such loaded cars shall be 30 per cent of the marked nominal carrying capacity plus the light weight of the car, based upon 50 lb. brake-cylinder pressure.

In the event the provisions of paragraphs (a) and (b) are adopted, we recommend substituting them for the braking ratios now shown under the heading: "Braking ratio for new freight cars. Adopted 1936," which appears at the bottom of page 14-E-1937 of the Manual of Standard and Recommended Practice.

Maintenance and Inspection of Brake Beams and Attachments

The Brake Committee's annual report for 1936 included a recommendation that a circular be issued to the member roads requesting closer inspection and better maintenance practice of brake-beam hangers and attachments. This circular was held in abeyance pending a further study of the matter with a view of modifying the present maintenance rules to provide for a better general condition of brake-beam hangers and attachments than is now provided for.

A member road submitted a report of a study made, with sketches and photographs of actual conditions found during their investigation, and pointed out that under the present wear limits now shown in Rule 63, there could be as much as 2½ in. lost motion in the brake hanger and attachments which they considered excessive, and in view of this, suggested that the issuance of the proposed circular be deferred until a further study of the subject could be made. This report has been considered and we concur with what is recommended therein, with perhaps one or two exceptions.

In order to reduce the vertical lost motion as far as is practical without undue increased maintenance cost, we recommend the following:

PROPOSED REVISIONS TO INTERCHANGE RULE 63

Proposed Form—(1) Brake-beam hangers with pin hole worn or elongated more than ⅜ in. larger than original diameter.

(2) Brake-beam hangers with top or bottom bearing section worn below 1⅜ in. when measured vertically or through the corners measured on the radius.

(3) Brake-beam hanger pins or bolts when worn below 1⅜ in. diameter.

(This to substitute present Paragraphs 3 and 4.)

(5) (a) The top eye opening is worn so that the opening measured vertically at hanger bearing is 1¼ in. or more.

(e) The over-all length of brake head is less than 11¾ in.

(6) Brake-hanger or hanger-pin bearing surface of brake-hanger bracket when worn or elongated to ¼ in. or more than the original opening or diameter.

(7) Where the total combined wear or lost motion between the brake head and the brake-hanger bracket exceeds 1⅜ in.

Note: The wear limits as prescribed in this rule are primarily intended to apply to inspection made of cars in shops or on repair tracks, for the reason that such parts cannot be measured or gaged with any degree of accuracy without disassembly. *The train yard inspector may readily determine the total lost motion by taking a dimension from some fixed point to a point on the brake head with the brakes released and brake rigging free by determining the amount the brake head can be raised.*

These proposed rules provide for reducing the wear limits of brake-hanger brackets, brake hangers, pins, and brake heads, which means, of course, that the service life of these parts will be correspondingly reduced.

In order to restore the service life of such parts, obviously they must be of such materials and so constructed that the wear of bearing surfaces will be prolonged. In order to accomplish this, brake-hanger brackets should be provided with hardened bushings or renewable wearing surfaces.

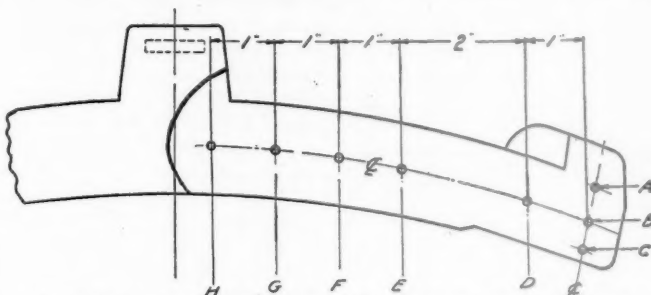
Loop type brake hangers should be used where possible to eliminate the necessity for brake pins, cotter keys, etc., and of such materials as will increase the service life as far as possible.

The wearing surfaces of the brake head should be hardened or equipped with renewable wearing surfaces where possible.

Careful consideration of these features, with a view of improving them along the above lines, will largely offset any increased maintenance cost resulting from the adoption of this proposed modification of present rules.

Specifications for Brake Shoes

After the present brake-shoe specifications were adopted and placed in the Manual it was brought to our attention by certain



Shoes shall be ground on side opposite gate to at least ⅜ in. depth

Fig. 2—Location of Points at which Hardness Determinations Shall Be Made on Brake Shoes

member roads that the specification test requirements could not be made on any brake-shoe testing machine other than the new machine of the American Brake Shoe & Foundry Company at Mahwah, New Jersey, and it was suggested that we give further consideration to a revision of this specification to provide suitable and alternate test requirements that could be made on the brake-shoe testing machines at Purdue University and the University of Illinois.

This required that further tests be made with equivalent wheel loads to the fixed wheel loads of the above mentioned machines. These tests have been made and were witnessed by a member of our sub-committee. From the data obtained we have prepared the necessary revisions to the test requirement tables to enable satisfactory tests to be made upon available testing machines.

We also believe it desirable to make a few other minor revisions to cover more adequately, in a practical way, certain specification requirements and recommend a revision of present specifications for brake shoes as set forth in the following proposals:

PROPOSED REVISIONS TO A. A. R. SPECIFICATIONS M-401-35

Proposed Form—Section II. Paragraph (b)—Preparation of wheel for test—The wheel after being mounted on the machine shall be wet ground to insure roundness with a grade of grinding wheel that produces a pitted wheel surface. The tread is to be ground parallel to the center line of the machine shaft and to

gage which will adequately cover both minimum and maximum dimensions throughout. These gages are shown in Fig. 3 and 4.

We recommend the adoption of these gages for checking brake shoe dimensions.

Standard Brake Shoe

The standard expanded metal insert shoe now shown on Page 89 of Section (E) of the Manual, adopted in 1935, provides for a shoe having an 18-in. face radius for passenger cars and another shoe having a 17-in. face radius for freight cars of three different dimensions of thickness. This requires the railroads to carry in stock separate shoes for freight and passenger equipment cars.

Since the adoption of this shoe, the suggestion has been made that we consider the use of a shoe having a compound face radii. When your committee looked into the matter and found that there was so very little difference between the 17-in. and 18-in. face radius brake shoe, it seemed quite practicable to consider a shoe having compound radii for both passenger and freight equipment cars. If such a shoe is adopted as standard, it will elimin-

Pennsylvania; L. S. Ayer, general air brake inspector, Southern Pacific, and J. P. Stewart, general supervisor air brakes, Missouri Pacific.

Discussion

Geo. S. Goodwin (C. R. I. & P.): With the older passenger cars, where you have the airbrake under the car, and attempt to connect on the brake shoe to either or both hand brakes, it is almost impossible to move those shoes into contact with the wheels. As I understand it, the requirement is that you must have at least 25 per cent of the total weight of the car braked, and if you brake that on one truck, that really becomes 50 per cent of the weight on that one truck that you must produce in that hand-brake.

I note that the committee is saying that the wearing surfaces of the brake heads should be hardened or equipped with renewable wearing surfaces. The experience we have had with renewable surfaces has not been so encouraging. We ought to have in mind that in any hardening that we attempt we should see that we do not get a degree of hardness which will produce

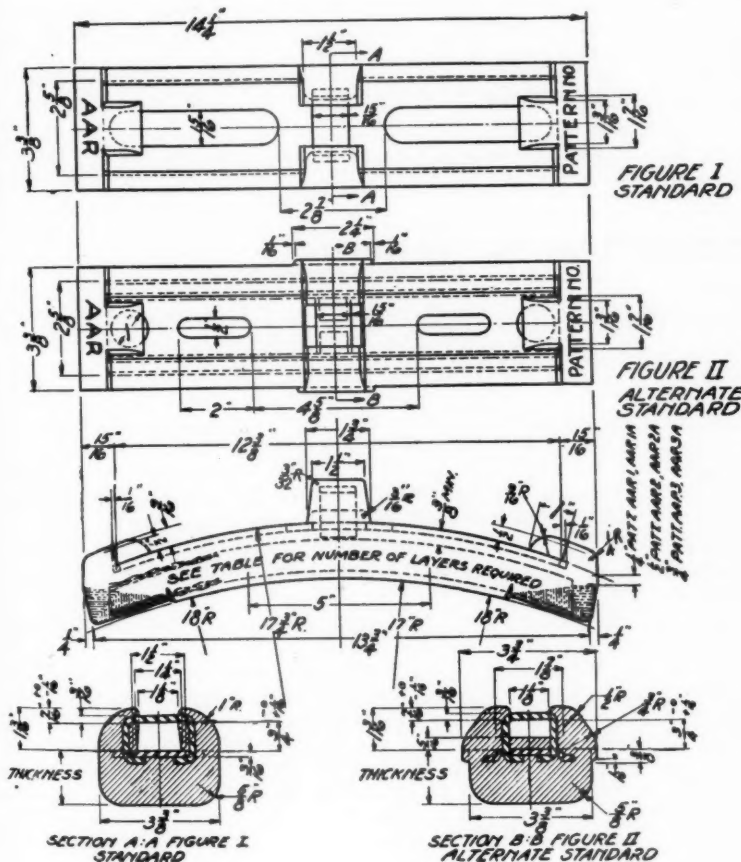
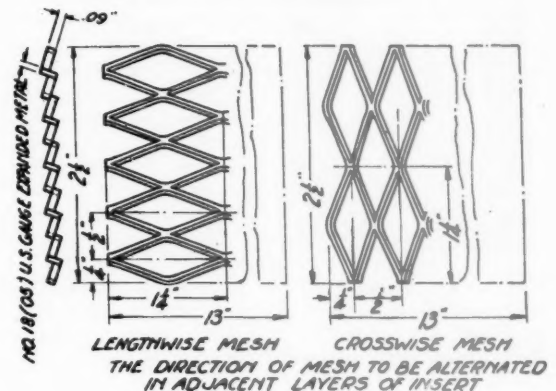


Fig. 5—New Standard Brake Shoe for Freight and Passenger Use with Compound Face Radii—This Proposed Design Replaces Two Separate Shoes of 17-In. and 18-In. Radii

UNFLANGED PASSENGER AND FREIGHT CAR SHOES			
PATTERN NO.	THICKNESS	NO. OF LAYERS IN EXPANDED METAL INSERT	
FIG I	FIG II		
AAR 1	AAR 1A	1 1/2"	5 LAYERS
AAR 2	AAR 2A	1 1/2"	6 LAYERS
AAR 3	AAR 3A	2"	7 LAYERS



ate the need of carrying separate shoes for freight and passenger equipment.

We are satisfied that a brake shoe having compound face radii will satisfactorily meet these requirements, therefore, it is our recommendation that the brake shoe shown in Fig. 5 be substituted to supersede that now shown on Page 89 of Section (E) of the Manual.

The report is signed by G. H. Wood (chairman), supervisor air brakes, Atchison, Topeka & Santa Fe; W. H. Clegg (vice-chairman), chief inspector air brakes and car heating equipment, Canadian National; R. E. Baker, general air brake inspector, Boston & Maine; T. L. Burton, air brake engineer, New York Central; M. Purcell, general air brake inspector, Northern Pacific; C. H. Rawlings, general air brake instructor, Denver & Rio Grande Western; M. A. Kinney, general master mechanic, Chesapeake & Ohio; R. C. Burns general foreman,

a brittleness, or a tendency to break with the brake head. The wear that we are trying to overcome in the brake-heads can be largely overcome if we will adopt a design of key which will keep the brake tight all the time.

Mr. Nystrom: Referring to proposed revisions of present A.A.R. Interchange Rule No. 63,—limiting dimensions for hanger—this was considered several years ago by a sub-committee of the Car Construction Committee. Careful consideration was given as to the advisability of specifying, as this committee does, the total slack, and we found it inadvisable.

In regard to the passenger-car hand brake. I do not know whether you appreciate the significance of this recommendation. It should be given very careful consideration before it is put out. With the latest developments in air brakes for high-speed trains, there does not seem to be any room left for hand brakes. The tendency appears to be that we will have individual brakes

on each wheel. If that is the case, how can you apply the hand brake?

A. G. Hoppe (C. M. St. P. & P.): In the drawing of the standard reinforced shoe there is a slight recession of the face of the shoe as it is chilled. I wonder if the committee would care to say how much that recession should be?

With this type shoe, for both freight and passenger service, is it the committee's intention, subsequently to the adoption of such a shoe and after a suitable period has been allowed to use up existing stocks, that all shoes applied in interchange must be of the composite ratings? Finally, I would like to call the attention of the freight committee to the new specification for steel bars, and suggest a revision of page 54, Section E of the manual. The present specification for the truss rod is rather involved, and as I was a party to helping make up the specification, I would like to be a party to simplifying it.

Geo. A. Wood (A. T. & S. F.): On the hand brake, it says that each hand brake should develop 25 per cent of the total weight of the car and if you brake one truck it means you must brake any one truck heavy enough to brake 25 per cent of that car.

Irrespective of the kind of hand brake, the car must be equipped with a hand brake. So far as the hand brake itself is concerned I do not think you will find any great difficulty in finding one with sufficient power. The difficulty is between the hand-brake chain rod and the connection to the air-brake foundation gear, particularly where we are using unit cylinders on the truck sides.

It is up to the manufacturers of trucks and brake gears to

work out some sort of a suitable and satisfactory connection that will permit you to connect the hand brake to the air-brake foundation gear. If they cannot do that we will have to ask for a modification of the present set of appliance rules.

On the subject of increasing the service life of such parts as hanger pins, we can use steel heads and we can use wear plates. We can harden the various parts but it is our purpose to call attention to the fact that any means available that will increase the service life should be given consideration. It is impractical for an inspector in the freight yard to attempt to use gages under the present rule covering the wear of these parts. We thought we would simplify the matter by specifying maximum lost motion for all of the parts. Mr. Nystrom says we have an inch hole with a one-half inch pin in it. That does not reflect any on the specifications. The thing to do is to get a $1\frac{1}{16}$ in. or $3\frac{1}{32}$ in. pin in that hole.

Chairman Burnett: Mr. Nystrom, for your information in connection with the wear limits not being handled by the Car Construction Committee, the Brake Committee was instructed by the General Committee to cover that question. They are acting under instructions in that case.

Mr. Nystrom: That does not alter the fact that if the recommendations are not practical we should not adopt them even if they are recommended by the General Committee. We know that sometimes we cannot control conditions on our own roads.

Mr. Hall: I move that we accept the committee report on Brakes and Brake Equipment and that the matter be referred to letter ballot.

(The motion was duly seconded and carried.)

Report of Committee on Wheels

Marking cast iron wheels—Revision of steel wheel specifications—Important data presented on the cause of wheel removals—Manual revisions



H. W. Coddington
Chairman

The revision of the cast iron wheel specification, as recommended in the 1936 report, was adopted by letter ballot and is identified as Specification M-403-36. The Association of Manufacturers of Chilled Car Wheels are working to this revised specification and have organized a corps of inspectors to contact the various plants of the association to be assured the members are working in conformity with the specification and foundry practices prescribed.

Experience with the 750-lb. 33-in. diameter cast-iron wheel has indicated the desirability of strengthening the rim structure under the flange. In meeting this requirement the manufacturers have applied the same principle of rim support as employed in the design of the 850-lb. wheel by introducing brackets between the plate and the inside of the rim under the flange.

750-Lb. 33-In. Bracket-Design Cast-Iron Wheels

In order not to exceed the specified weight and at the same time not decrease the plate thickness beyond desirable limits it was necessary to take approximately 20 lb. of metal from the wheel hub, coring the hub circumferentially as shown in Fig. 1.

This coring of the hub is not an innovation; the idea was advanced some 58 years ago, but has been revived within recent years. The coring of the hub section may raise a question as to how this may affect mounting practices. It has been demonstrated that the four $2\frac{1}{8}$ -in. wide bridges binding the front and back sections of the hub together have eliminated any undesirable features from developing in the mounting practice. The positions of the bridges and the arrangement of the brackets on the

back plate of the wheel are illustrated as is shown in Fig. 2.

The wheel committee has approved placing in service a group of from 5,000 to 10,000 of these 750-lb. 33-in. bracket-design wheels to be identified as experimental designs by the marking AAR-X which provides for their acceptance in interchange.

Marking of Cast Iron Wheels

Fig. 1 of the cast-iron wheel specification M-403-36 illustrates the method of marking cast-iron wheels. This arrangement of marking shows the tape sizes located radially outside the identification number. As difficulty is experienced in chipping the tape sizes located so close under the rim, it is recommended that these tape sizes be moved to a position where they will be on the same circumferential line as the other identification markings on the back plate of the wheel. Recommendation has also been made that the figures used on the back plate be changed slightly in design. Both of these suggested changes are illustrated in Fig. No. 3. The committee approves these changes and if the action is sustained by the association, Fig. 1 of Specification M-403-36 and Plate D-35-37 of the Manual of Standard and Recommended Practice should be revised accordingly.

Out-of-Round Wheels—Rule 73-A

A note accompanying Rule 73-A relative to out-of-round wheels states that if wheels are reclaimed by grinding, they must not be applied to foreign cars.

This reference to grinding cast-iron wheels has lead to the opinion that the rule is to apply only to cast-iron wheels and the committee has been asked for an expression on this subject. In recommending the establishment of a rule on out-of-round wheels it was with the intention that since the damaging influence of Out-of-Roundness upon track, equipment and lading is the same, regardless of the type of wheel, it should apply to all 33-in. wheels.

A question has also been raised in connection with the appli-

cation of the out-of-round gage as to what position on the wheel it should be applied. As nearly as it can be defined, the application of the out-of-round gage should be applied upon approximately the center line of the tread and parallel to the flange.

Obsolete Cast-Iron Wheels

In order to afford better protection against the use of obsolete cast-iron wheels in making repairs to foreign cars, the wheel committee has recommended to the Arbitration Committee that consideration be given to formulating a rule that will forbid the application to foreign cars of double-plate cast-iron wheels cast prior to January 1, 1921, and such wheels removed on account of defects on a mate wheel should be given only scrap value regardless of the condition of the wheel.

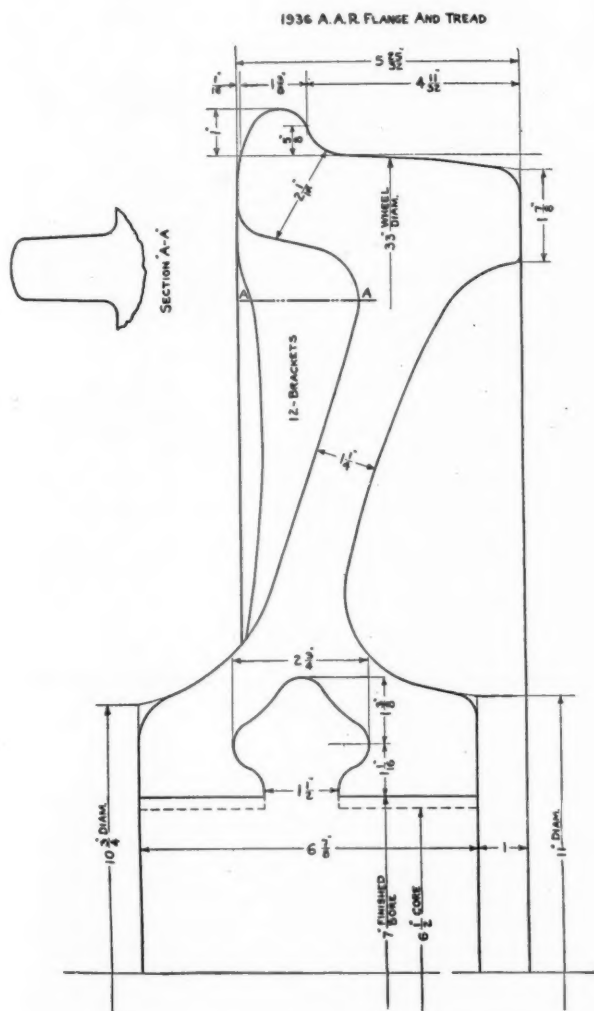
Rule 98, Interpretation 10

The question has arisen as to whether Interpretation 10, Rule 98, should be modified to include wheels removed within 90 days after date of application on account of an out-of-round condition.

This committee is of the opinion that out-of-round condition should be included in Interpretation 10 of Rule 98 and has so recommended to the Arbitration Committee.

Reducing Condemning Limit for Flats Spots

The committee in its 1936 report referred to consideration being given the advisability of recommending a reduction in the condemning limit for flat spots in the tread surface from the present 2½-in. dimension.



**Fig. 1—33-In., 750-Lb. Bracket Wheel with Cored Hub
for 5½-In. by 10-In. Journal Axles**

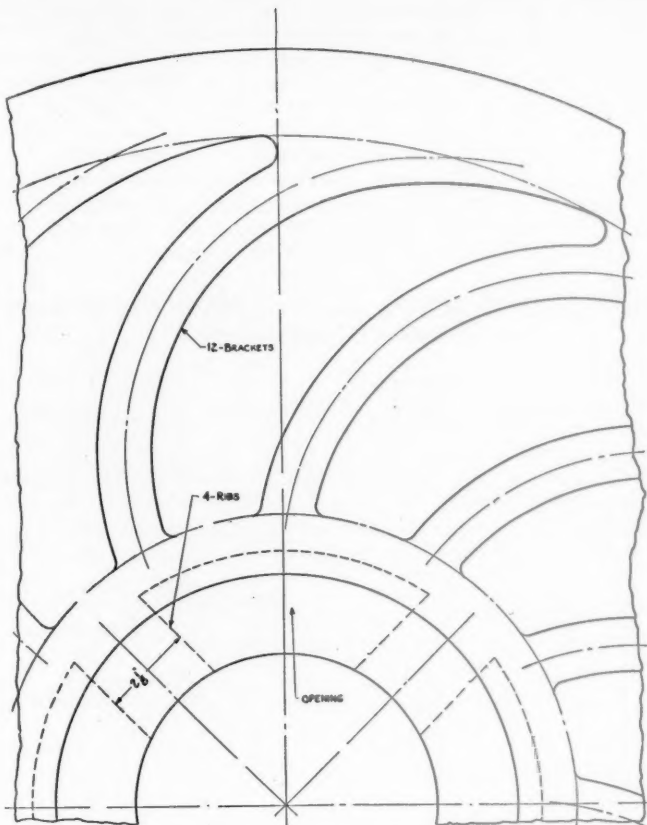


Fig. 2—33-In., 750-Lb. Bracket Wheel with Cored Hub for 5½-In. by 10-In. Journal Axles

Because of the extreme importance and the far-reaching influence that might be attached to a recommendation in this direction, the committee does not consider it has sufficient information available to make a recommendation or even a suggestion at this time.

The matter is being given further consideration and to gain some constructive information as to the effect of flat spots on rail stresses from the data that has already been developed through the efforts of the Maintenance of Way Department, a sub-committee has been appointed to give further consideration to this subject.

Cylindrical-Tread Wheels

The subject of cylindrical-tread wheels is still on the committee's open docket, but there has been no evidence presented that indicates that the cylindrical tread wheel is adapted to all classes of equipment and service. It has been definitely demonstrated that under certain operating conditions the cylindrical tread wheel has proven an advantage. On the other hand, in curved track territory it has been demonstrated that cylindrical treads tend to increase flange wear to such an extent it would be impractical. It is the opinion of the committee that the use of the cylindrical-tread wheel is a local proposition, the value of which must be demonstrated to be justified.

Shelling of Wrought- and Cast-Steel Wheels

Shelling of wrought- and cast-steel wheels, particularly in high-speed passenger service and in locomotive tender service, continues as a major factor in the early removal of a high percentage of these wheels before they have closely approached existing wear condemning limits. The removal of wheels due to this condition not only introduces an additional labor cost and detention of serviceable equipment, but also results in an extravagant loss of service metal due to the heavy cuts usually required to get under the influence of this shelled condition in restoring the wheel to standard contour. It is not infrequent in cases of deep shelling for as much as $\frac{3}{4}$ in. and sometimes even more, of the tread metal to be sacrificed in this operation.

The wheel manufacturers are conversant with this condition and are active in their efforts to find a satisfactory solution to the problem through the means of heat treatment and the use of alloy steels. As the results of each change in process or character of steel must be demonstrated in service it necessarily delays reaching any definite conclusions as to what is being accomplished, although it is evident that progress is being made. It is believed that with continued effort on the part of the manufacturers and the co-operation of the railroads by supplying a proving ground for their various developments that eventually this perplexing problem will be satisfactorily solved.

Revision of One-Wear and Two-Wear Wrought-Steel Wheel Specifications

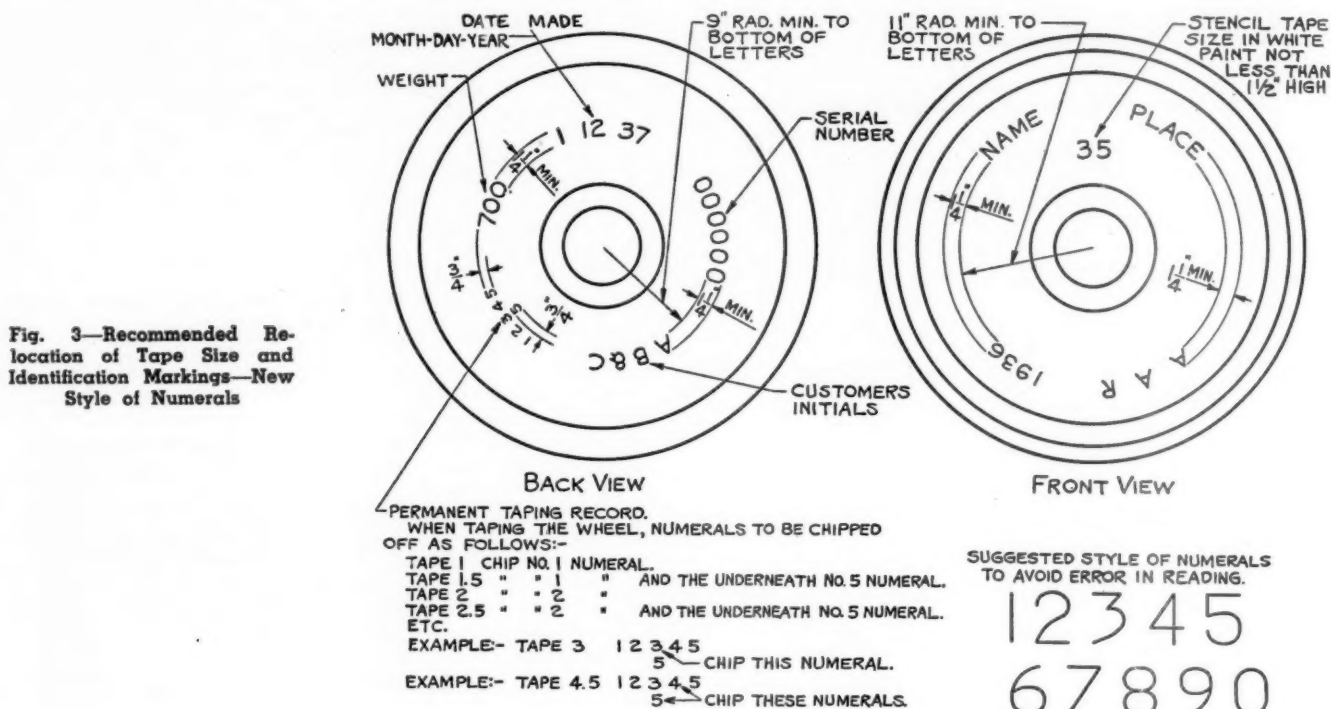
Specifications M-103-36 and M-121-36—Section VI—Finish, Par. 9 (a) reads as follows: "Wheels shall be rough bored; faces of hub may be furnished as forged and contour of tread and flange as rolled."

Trouble has been encountered in the mounting of one-wear wrought-steel wheels where the front face of the hub was unfinished. The trouble experienced was attributed to the irregu-

Depression of Hub

In providing proper clearances between the hub face and the journal box the position of the outside face of the hub should be shown with respect to the vertical reference line, as this is associated with the flange dimensions, rather than the outside face of the rim which has no tracking influence upon the wheel. It is, therefore, recommended that Par. 7 (q) of Specifications M-103-36 and M-121-36 be revised to read as follows: Paragraph 7 (q)—Depression of Hub—The depression of the hub shall be measured with reference to the vertical reference line and conform to the dimensions and tolerances shown in Fig. 1 and Fig. 2.

To conform with the above recommended revision of the one-wear wrought steel wheel Specification M-103-36, the dimensioning of Fig. 1 of the specification and Plate D-47-37 should be revised to show the relationship of the front face of the hub to the vertical reference line "d" dimension as $3\frac{13}{32}$ in., plus 0, minus $\frac{1}{8}$ in., and Fig. 2 of the same specification and Plate D-48-37, should show the "d" dimension as $3\frac{5}{32}$ in., plus 0, minus $\frac{1}{8}$ in., see this report Figs. 4 and 5 respectively. Likewise the two-wear wrought-steel wheel Specification M-121-36, Fig. 1 and Plate D-41-37 should be revised to show the relationship of the



lar surfaces of the face of the hub causing the wheel to cant in starting on the axle, which resulted in scoring the wheel seat to the extent that either re-machining was necessary, or what was even worse, readjusting the wheel and mounting it over this scored surface, since such a scored condition may act as stress risers and ultimately result in an axle failure. These rough forged hub faces will also have a damaging influence upon the journal boxes. It is felt that journal boxes should be offered every protection against hub wear on account of the large number of side frames of the integral type already in service and being applied and journal boxes discarded for hub wear on one of these will mean a scrapped side frame.

On new construction the hubs will probably have sufficient clearances not to contact the journal boxes, but as wear increases the journal length and decreases the effective length of the brass, the hub of the wheel and journal box will eventually come in contact.

In view of these conditions, your committee considers that Par. 9 (a) of the one-wear and two-wear wrought-steel wheel specifications should be revised to read as follows: "Paragraph 9 (a)—Finish—Wheels shall be rough bored; front face of hub shall be smooth forged or machined and parallel to the plane of the vertical reference line, back face of the hub may be furnished as forged, and contour of tread and flange as rolled."

front face of the hub to the vertical reference line as $3\frac{13}{32}$ in., plus 0, minus $\frac{1}{8}$ in., and Fig. 2 of the same specification and Plate D-42-37 should be dimensioned to show the relationship of the front face of the hub to the vertical reference line as $3\frac{5}{32}$ in., plus 0, minus $\frac{1}{8}$ in.

Revision of Multiple-Wear Wrought-Steel Wheel Specification

Assuming that the foregoing recommendation with reference to the method of determining the hub depression is approved by the association, then Section IV, Par. 10 (o) of the multiple-wear wrought steel wheel Specification M-107-36 should be revised in order that the same method will apply to all three types of wrought-steel wheels, and Paragraph 10 (o) should be revised to read as follows: Depression of Hubs—For car and tender wheels and wheels of similar design, with journal box located at front face of hub, the depression of the hub shall be measured with reference to the vertical reference line and shall conform to the dimensions and tolerances shown in Plates D-43, D-44, D-45 and D-46.

The association has no recommended gage for determining hub depression, and in connection with the recommended revision of

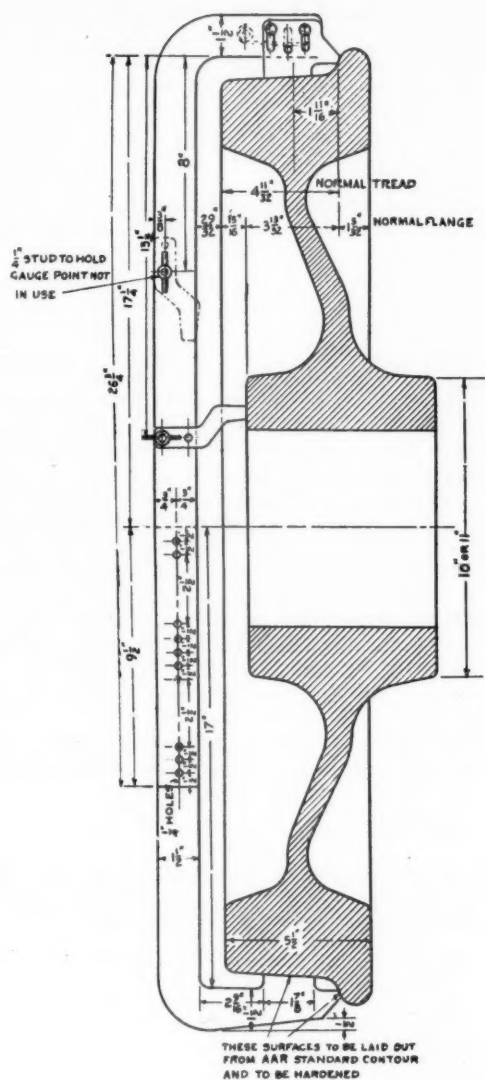


Fig. 4—Hub Depression Gauge Recommended for All Wrought-Steel Wheels

Par. 7 (q) of Specifications M-103-36 and M-121-36, and Par. 10 (o) of Specification M-107-36, a design of hub depression gage is presented and shown as Fig. 4. This suggested gage is adaptable to both 33-in. and 36-in. diameter wheels and the special advantage of this gage is that it can be readily applied by one operator in the inspection of wheels where they are stacked with the face outward.

Flange Condemning Limit for Cast-Steel Wheels

The roads that have been using cast-steel wheels under locomotives and tenders are suffering an appreciable loss in wheel service on account of the I.C.C. flange condemning limits being more exacting on cast-steel wheels than on wrought-steel wheels in similar service and recommendations have come from member roads using cast-steel wheels in locomotive and tender service requesting that an effort be made to secure from the I.C.C. Bureau of Locomotive Inspection a ruling permitting the same flange condemning limits on cast-steel wheels as now applies to wrought-steel wheels used in locomotive and tender service.

During the past year the secretary secured from the cast-steel wheel manufacturers the names of the roads to which they had furnished cast-steel wheels, and the number furnished each road.

The inquiry developed that there had been furnished railroads and private car lines to that date a total of 322,784 cast-steel wheels.

After this information was furnished, the secretary addressed each of the roads requesting that they advise as to whether their experience with cast-steel wheels indicated it would be perfectly safe to reduce the flange thickness condemning limit when ap-

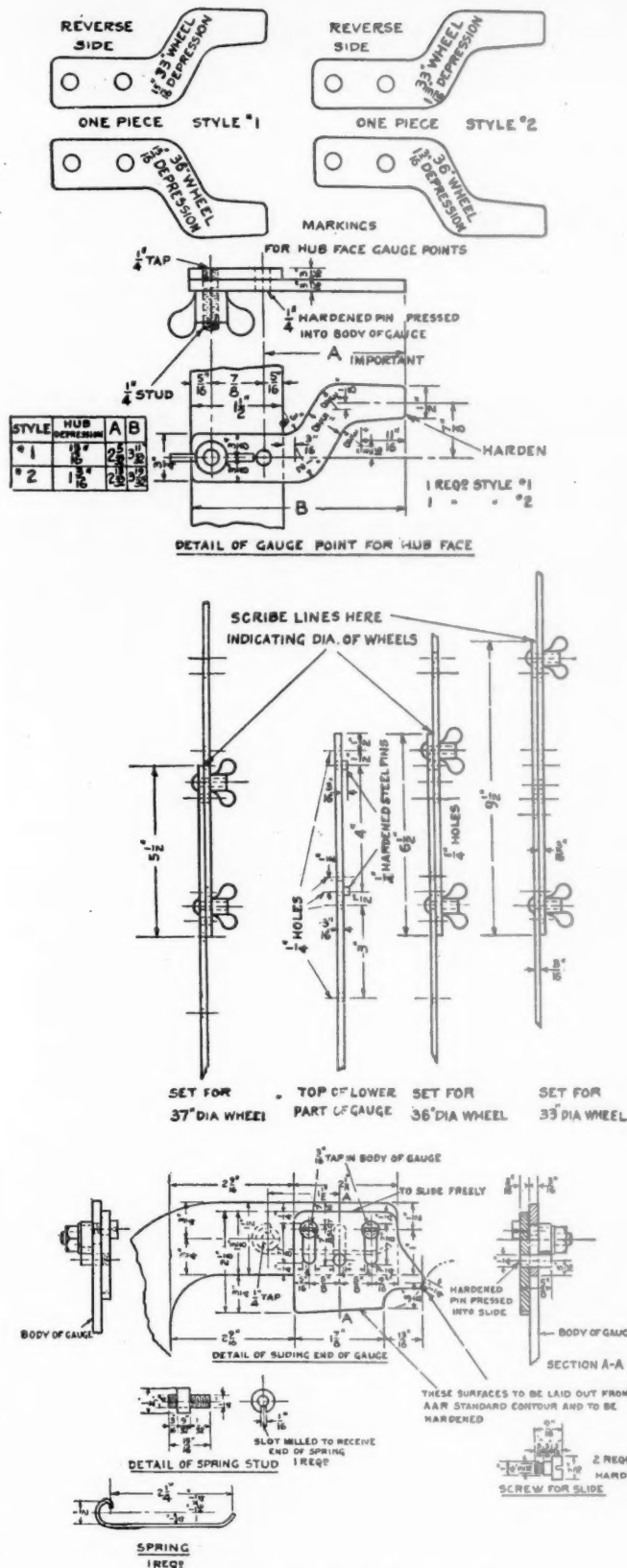


Fig. 5—Details of the Gauge Shown in Fig. 4

plied to locomotives from the present existing limit of 1 in. to $\frac{15}{16}$ in., which latter limit applies to wrought-steel wheels.

The replies were to the effect that in their opinion, and based upon their service experience with cast-steel wheels, the I.C.C. condemning limit for flange thickness might be reduced from 1 in. to $\frac{15}{16}$ in. for wheels used in locomotive service without sacrificing in any degree safety in operation.

It is the recommendation of your committee that this information be put in proper form and submitted to the I.C.C. in the

manner prescribed for handling such matters, with the request that I.C.C. locomotive inspection Rule 145 be revised so as to prescribe the same flange condemning limits for cast-steel wheels as applies to wrought-steel wheels used in locomotive service.

Revision of Note Under Section "W" of Interchange Rule 3

In order to provide against wheels being placed in service that are made to specification requirements less exacting than those prescribed in A.A.R. specifications, and to provide for marking acceptable experimental wheels, it was recommended to the Ar-

Road B—Exhibit 1: Summary of Causes of Cast Iron Wheel Removals from Freight Cars During Three Winter Months, December 1936, January and February 1937

Symbol	Cause of removal	WHEELS CONDEMNED BY A.A.R. STANDARD GAGES					
		Wheels removed				Total Wheels re- moved	Per cent
		Single plate	Double plate	Single plate	Double plate		
78-R	Broken rim	123	238	23.47	43.11	361	33.55
68	Flat sliding	170	107	32.45	19.38	277	25.74
72	Seams	44	83	8.40	15.04	127	11.80
75-C	Brake burn, comby	83	28	15.84	5.07	111	10.32
73	Worn thru chill	17	23	3.24	4.17	40	3.72
71	Shelled out	13	16	2.48	2.90	29	2.70
81-L	Loose	17	9	3.24	1.63	26	2.42
76	Tread worn hollow	17	7	3.24	1.27	24	2.23
74-T	Flange worn thin	8	14	1.53	2.54	22	2.04
78	Chipped flange	10	7	1.91	1.27	17	1.58
74-V	Vertical flange	9	6	1.72	1.09	15	1.39
78-F	Flange cracked or broken	3	9	0.57	1.63	12	1.12
75	Brake burn cracks	9	0	1.72	0	9	0.84
78-P	Plate cracked or broken	0	4	0	0.72	4	0.37
78-B	Bracket cracked or broken	0	1	0	0.18	1	0.09
71-F	Flat, comby	1	0	0.19	0	1	0.09
	Total	524	552	100.00	100.00	1076	100.00

CONDEMNED BY REMOUNT GAGE						
82-W	Tread worn hollow	91	129	70.54	58.90	220
82-T	Thin flange	5	37	3.88	16.89	42
82-S	Shelled out	12	20	9.30	9.13	32
82-C	Brake burn, comby	7	10	5.43	4.57	17
82-V	Vertical flange	8	7	6.20	3.20	15
83	Wt. less than 650, 700 and 750 lb.	0	12	0	5.48	12
82	Brake burn cracks	6	4	4.65	1.83	10
	Total	129	219	100.00	100.00	348

DEFECTIVE AXLES						
84	Cut or burnt journal	90	35	95.74	79.55	125
86-C	Journal overlength (remount)	2	4	2.13	9.09	6
85-A	Seamy journal	2	1	2.13	2.28	3
86-E	Collar worn beyond limit (remount)	0	1	0	2.27	1
85-D	Collar worn to limit	0	1	0	2.27	1
84-B	Axle damaged in handling	0	1	0	2.27	1
85-F	Axle worn beyond limits by brake chain or brake rod	0	1	0	2.27	1
	Total	94	44	100.00	100.00	138

GRAND TOTAL				
Item	Secondhand	Defective	Total	Per cent Defective
Single plate wheels	275	653	928	70.37
Double plate wheels	147	771	918	83.99
Total wheels	422	1424	1846	77.14
Axles	785	138	923	14.95

bitration Committee that note under Sec. (w) of Interchange Rule 3 be revised to read substantially as follows:

Proposed Form—Note: The letters "A.A.R." shall not be put on any cast-iron wheel which is of less weight than the standards of the A.A.R., or any wheels which are made to specifications with requirements less than those prescribed in A.A.R. Specifications. Cast-iron or wrought-steel wheels marked "A.A.R.X." indicating experimental wheels authorized by the A.A.R. Committee on Wheels will be accepted in interchange.

Wheel Defect Symbols

It is recommended that a symbol for out-of-round condition on multiple-wear wrought-steel wheels be expressed as 73-R and included in the list of symbols published in the manual and the interchange rules.

Wheel Service Records

The General Committee has for some time been desirous that the Wheel Committee compile information showing the primary causes for which wheels are removed from service. Where the use of symbol defect tags is practiced, such information as requested by the General Committee is available. The members of the Wheel Committee were solicited to furnish records of this character for three winter and three summer months. Sufficient time was not available to carry out this program to its fullest extent, but some very interesting information has been compiled from the three winter months' record of three representative roads. It is on the committee's program in the following year to supplement this with a similar statement of a three summer months' record.

The roads that supplied the information on wheel removals have been designated as roads A, B and C and the information compiled in tabular form.

[Tables for Road B, only, are included with this abstract of the committee's report, being preferred as typical of a road of most nearly average size.—EDITOR.]

The information contained in these exhibits provide data for an interesting study of the conditions entering into the removal of the three different types of wheels. The cast iron wheel statements have been so compiled that comparison can readily be made of the percentage of single-plate and double-plate wheels removed for the same defect. These exhibits have also been arranged in such order that the percentages of wheels removed for the different defects are listed in decreasing percentage order in all exhibits.

Considering Exhibit 1 relating to cast-iron wheels, the first four defects listed represent the four primary causes of wheel

Road B—Exhibit 2: Summary of Causes of Multiple-Wear Wrought Steel Wheel Removals from All Freight, Passenger and Tender Equipment During Three Winter Months, December 1936, January and February, 1937

WHEELS CONDEMNED BY A. A. R. STANDARD GAGES			
Summary			
Symbols	Cause of removal	Wheels removed	Per cent
74-T	Flange worn thin	936	45.88
68	Flat sliding	296	14.51
76	High flange or tread worn hollow	263	12.89
107	Built up tread	171	8.38
81-L	Loose	116	5.69
71-E	Shelled tread (less than 3/8 in.)	92	4.51
81-G	Out of gage	51	2.50
79	Thin rim	35	1.71
74-V	Vertical flange	27	1.32
71-A	Burnt rim	21	1.03
71-B	Shattered rim	12	0.59
71-C	Spread rim	11	0.54
71-S	Shelled tread (3/8 in. or over)	5	0.25
80	Broken flange	2	0.10
80-A	Cracked plate (radial)	1	0.05
78	Chipped flange	1	0.05
	Total	2040	100.00

DEFECTIVE AXLES			
84	Cut or burnt journal	412	98.10
84-A	Bent axle	2	0.47
85-C	Journal over length	2	0.47
84-C	Pitted or rusty journal	1	0.24
86-C	Journal over length (remount)	1	0.24
85-B	Back fillet too small	1	0.24
85-D	Collar worn to limit	1	0.24
	Total	420	100.00

GRAND TOTAL				
Item	Secondhand	Defective	Total	Per cent Defective
Wrought-steel wheels	1158	2040	3198	63.79
Axles	1179	420	1599	26.27

removals. On Road A the four primary causes of removal are broken rim, worn through chill, brake burn, and seams, which four defects cover 71 per cent of the wheels removed.

On Road B, the four primary causes of removal were broken rim, flat sliding, seams, and brake burns, constituting 81.4 per cent of the total wheels removed, while on Road C the four primary defects were broken rim, worn through chill, seams, and flat sliding, which also constitute 81.4 per cent of the total number of wheels removed. Following this record of wheels removed for the various defects is a statement of wheels condemned by the remount gage for the different defects and the

number of defective axles encountered and the nature of the defect. Considering the wheels condemned by the remount gage, it will be observed the major defect on each road is tread worn hollow.

In connection with the defective axles encountered, attention is directed to the high percentage removed on account of cut or burnt journal.

Wrought-Steel Wheels

A review of the Exhibit 2 giving the cause of removal of wrought steel wheels shows the major defects to be the first three enumerated. On Road A the three major defects are thin flange, built-up tread and slid flat, and constitute 83.8 per cent of all wheels removed.

On Road B the three principal defects are thin flange, flat sliding and high flange, which constitute 73.1 per cent of the wheels removed, while on Road C, where only a limited number of wheels are represented, the three major factors were worn flange, thin rim and slid flat, which represent 92.8 per cent of the wrought steel wheels removed.

Road A is the only road reporting on cast steel wheels and this statement is confined to a limited number, but it will be noticed the first three defects, namely—thin flange, shelled, and built-up tread are the primary causes of removal and represent 50 per cent of the cast steel wheels reported.

Your committee wishes to encourage the practice of applying defect tags to all wheels removed in order that each road can obtain from such reliable data a concrete picture of just what conditions are most prominent in the cause of removal of wheels on that particular road.

Increasing Rim Thickness of Multiple-Wear Wheels

The committee has observed that some of the roads are following the practice, in the purchase of multiple-wear wheels, of specifying 3-in. rim thickness instead of the conventional 2½-in. rim thickness. On account of the comparatively small ratio of available wearing material in the rim of the wheel to the total weight of the wheel, it is considered where clearances will permit the use of the 3-in. thickness rim, the practice of using the heavier rim should be an economical procedure. The committee, in reviewing the subject, does not see that any exception can be taken to this practice where resultant economy may obtain.

Master Gages for Checking Wheel and Axle Inspection and Condemning Limit Gages

Plate B-69-1930 in the A.A.R. Manual of Standard and Recommended practice is descriptive of a master gage designed for checking the accuracy of certain standard wheel gages in use at that time. This master gage may now be considered as obsolete, as changes have been made in some of the gages it was designed to control, and several other gages have been developed and adopted as standard practice for which no means for checking is provided in this master. Your committee was given the assignment of developing suitable masters for all wheel gages, including those that are used in the manufacturer's plant, wheel shops and in connection with interchange rules. The number of gages now employed in connection with wheel interests are too numerous to attempt to design a single master gage against which the various gages could be checked.

It was decided in designing these masters it would be better to prepare a master gage for each individual gage. This design work has now been completed, and following is a list of 23 master gages that have been designed to take care of the various wheel gages. This list consists of the figure number reference identifying the master gage as shown in this report, the manufacturer's drawing number, the title of the gage it is designed to check, and identity of each gage as to figure number and plate number as shown in the Wheel and Axle Manual and the A.A.R. Manual of standard and recommended practice, respectively:

Appendix A (not included in this abstract of the committee's report) presents complete drawings of the 23 master gages, Figs. 12 to 34 inclusive. By reference to these construction drawings it will be observed that the Master Gages have been designed

on the basis of go and no-go principle, and have been made as simple in construction as conditions permit.

Revision of Wheel and Axle Manual

The Wheel and Axle Manual that was published and adopted as a recommended practice in 1928 and later revised in 1935 is again in need of revision to keep it in conformity with existing and recommended standards. In the last two years there has been a general revision of wheel specifications which involve not only the text of the specifications, but the wheel designs that are necessarily a part of such specifications. The specification for two-wear wrought-steel wheels has been adopted within this period. Changes have been made in existing gages and additional gages have been adopted that apply in the inspection of wheels, both in the manufacturer's plant and in interchange practice.

The association may not be justified in revising and publishing a new manual at this time, but it is the opinion of your committee that the present 1935 revised manual should be brought up to date, although it may involve publishing a supplement to the present Wheel and Axle Manual. In connection with this revision your committee has gone through the present manual and finds there are 61 pages upon which changes of more or less importance should be made to bring the manual in conformity with present standards and the changes that may result from recommendations contained in the 1937 Report.

Appendix B (not included in this abstract of the report) records the changes that should be made in revising the Wheel and Axle Manual.

The report was signed by H. W. Coddington (chairman), chief chemical and test engineer, Norfolk & Western; D. Wood (vice-chairman), engineer tests, Southern Pacific; C. T. Ripley, chief mechanical engineer, Atchison, Topeka & Santa Fe; O. C. Cromwell, assistant to chief motive power and equipment, Baltimore & Ohio; J. Matthes, chief car inspector, Wabash; A. M. Johnson, engineer tests, Pullman Company; E. C. Hardy, assistant engineer, New York Central; A. G. Hoppe, assistant mechanical engineer, Chicago, Milwaukee, St. Paul & Pacific; H. H. Haupt, general superintendent motive power, Central Region, Pennsylvania.

Discussion

Mr. McMullen: When a wheel is worn out of round so it will take the remount gage, I do not think it should be ground for the reason that there must be some inherent defect at that point, otherwise it would not wear out of round. It must be low in chill. That is one question.

The next question is, have we a gage to condemn a gage that is in service?

Mr. Coddington: In regard to wheels worn out of round I think we have to consider that in a rather broad sense. If you are speaking of cast-iron wheels, such a condition would probably be indicative of worn through chill. On the other hand, it might be indicative, in a wrought-steel wheel of some skidding concentrated on that point, and eventually smoothing up by brake action, and so be out of round.

Mr. McMullen: I said worn out of round, not skidding.

Mr. Coddington: I do not know how you are going to differentiate between worn out of round and a wheel that may be out of round from some other cause, if that wheel is run subsequent to that condition and the brake shoes have chewed up the surface. I am unable to answer that.

The master gages that have been presented here are for the purpose of checking the gages on your road.

W. N. Messimer (N. Y. C.): An item of special interest is the out-of-round gage for condemning wheels under Interchange Rule 73-A. It is of common knowledge that this gage was originally developed to provide a means for determining when the condemning limits for worn through chill had been exceeded, and, as this defect is peculiar to cast-iron wheels, the gage became exclusively associated with that type of wheel. On account of the same gage being subsequently adopted for condemning out-of-round 33-in. wheels of any type, and to avoid the misunderstanding that the rule continues to apply to cast-iron wheels only, the explanation given in the report is very appropriate.

The recommendation to revise Rule 98, Interpretation 10, to include wheels condemned for out-of-round condition is consistent

with the protection given those condemned due to worn through chill, worn flange or tread worn hollow. Obviously the car owner is entitled to an adjustment when required to replace wheels within so short a period, but when offering this protection it should also be considered that the repairing line would be required to make adjustments in many instances without having had a reasonable opportunity to protect itself beforehand.

The tread and flange of cast-iron, one-wear wrought- or cast-steel wheels applied to foreign cars should be within remount limits, and any such wheels complying therewith will seldom, if ever, require removal on account of excessive tread or flange wear within 90 days of date of previous application. If, however, wheels are condemned on that account within the 90-day period, it is reasonable to assume that they were worn beyond remount limits when previously applied, and it is proper that the repairing line be penalized and the owner reimbursed.

There should be no objection to the inclusion of "out-of-round" in Interpretation 10 of Interchange Rule 98, but to remove the inequity which its inclusion will create, and also to insure that wheels nearing the out-of-round limit will have sufficient service life to warrant the expense of application, the development and adoption of a remount gage for this defect is advocated.

The present condemning limits for brake-burn cracks and comby conditions in cast-iron wheels are considered satisfactory, but due to the nature of the defects it is difficult to determine when they have reached the point of condemnation. When wheels containing brake-burn cracks are gaged while wheel is still warm, the extent of the crack can be readily observed, but after it has cooled the ends of the crack close due to shrinkage and cannot be seen.

There is also question as to how the words "into the throat of the flange" in first paragraph of Rule 75 should be interpreted. The throat is understood to start from the point where the throat radius meets the straight portion of the tread, and on new wheels this point has a definite location, although not easily determined without some method of gaging. On worn wheels, the throat is irregular and its location is entirely a matter of judgment.

It would seem desirable that the committee give consideration toward development of a gaging method that will locate the throat of the flange on an average wheel in order to provide a definite and uniform practice for condemning wheels for brake-burn cracks extending into the throat of the flange.

It is assumed that most of the steel-wheel manufacturers are complying with the minimum requirements of the wrought-steel wheel specifications, including the application of the marking "A.A.R.," but to insure complete compliance it would seem

advisable to insert an additional paragraph in Rule 3, sect. (w), to provide that wrought-steel wheels manufactured after January 1, 1938, without the marking "A.A.R." will be prohibited on all cars in interchange. Such addition to the rule would also conform to the present requirements affecting cast-iron wheels.

O. C. Cromwell (B. & O.): I cannot see any reason for the introduction of a reference line which you can not place on the wheel. To the mechanics, the reference line is the base line for measurement. That must be laid on the wheel itself. It will be laid on a smooth surface, and as we take measurements on that, it is done by rulers, by gages, by calipers and by compasses. In this case you can't do that. I would urge that consideration be given to the elimination of the reference line.

The flange of the wheel has been the reference line ever since we have been making wheels. The flange is the thing that controls the action and the life of the wheels. We note that it has been reported by this committee that some railroads turn their wheels to give exact diameters by means of calipers, and so they have reduced the wear of the wheel flanges and increased their life as much as 100 per cent.

Mr. Coddington: It may be that some trouble will be encountered in the application of the out-of-round gage to small diameter wheels. So far it has not come to the attention of the committee that any road has run into any difficulty. It will have to be given consideration if it occurs.

With reference to the adoption of the vertical reference line, to which Mr. Cromwell has referred, instead of the A. B. line, this matter was presented to the association last year and passed by letter ballot. It was the feeling of the committee that a vertical reference line passing through the face of the flange.

Mr. Ripley: I move that the report of the committee be accepted and that the recommendations submitted to letter ballot. *(The motion was duly seconded and carried.)*

Chairman Burnett: We have one more short subject and that is the report of the Committee on Resolutions. I will call on Mr. Henley.

Mr. Henley: Your Committee on Resolutions suggests that we send to two of our respective and loyal workers of the Association the following telegram on account of their inability to be present at this meeting. It reads:

"The Mechanical Division of the Association of American Railroads in convention assembled have missed you and regret your inability to attend.

The members have asked me to express our sincere wishes for your continued health and happiness." This is addressed to Mr. G. E. Smart and Mrs. J. J. Hennesy.

Report of Committee on Resolutions

WHEREAS, The Railway Supply Manufacturers Association has this year exceeded all exhibits formerly made, which have been so successfully and interestingly explained to all officers by the individual firms' representatives, and have so generously arranged for the entertainment of members and families of the Mechanical Division, and

WHEREAS, The Mayor and people of Atlantic City, in providing the most wonderful auditorium and other courtesies extended, have continued to make this a city so much to be respected and inviting to our convention, and

WHEREAS, The Atlantic City Hotel Men's Association has provided so comfortably for our sojourn while in this City, and

WHEREAS, We do appreciate to the fullest extent the attendance and most helpful addresses given to the convention by J. M. Symes and the Honorable Frank McManamy, and the individual papers by L. K. Sillcox on the subject of "What Next in Car Equipment," and by W. H. Winterrowd on the subject of "Research and Steam Locomotive Development," and

WHEREAS, The *Railway Age*, as is their usual practice, has in such a prompt and fitting manner, printed all committee reports and discussions and edited the daily arrivals, and

WHEREAS, The committees have so fully compiled their reports and presented them in such a forceful and interesting manner, and

WHEREAS, The Pennsylvania Railroad has so successfully arranged for special convention trains and, with the Pennsylvania-Reading Seashore Lines and other railroads, have so liberally provided transportation to the members and their families to enable them to reach Atlantic City, and

WHEREAS, The continued interest of the Executives of the Association of American Railroads and the railroads of the Mechanical Division lends inspiration to our future work, and

WHEREAS, The meetings of the present convention have been so ably planned and guided by the officers, the Secretary and his staff, the subjects prepared of such unusual interest bringing forth more than the usual discussion, so be it

RESOLVED, That the thanks and appreciation of the Mechanical Division be extended to all of the aforesaid mentioned who have in any way a part in making it possible for this one of the largest and most interesting conventions ever held.

Mr. Hall: Mr. Chairman, I move the adoption of the report.

(The motion was duly seconded, and carried.)

(The retiring members of the General Committee were re-elected at the time of the presentation of the report of the Nominating Committee.)

The meeting adjourned sine die.